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Body Adaptation to Change in Diet[1]

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IT HAS long been recognized that the animal organism, and particularly the human body, can adjust to wide differences in relative proportions of the three major foodstuffs, carbohydrate, fat, and protein. The eskimo lives almost entirely on fat and protein. The South Asiatic lives on a diet which is predominantly carbohydrate. If either were transferred to the other diet he would be ill. With these differences in the consumption of major foodstuffs go changes in the need for the various accessory types of food.

Our interest in this problem arose when we fed equicaloric diets high in each of the major constituents to rats by means of the stomach tube in an investigation of the role of the pituitary gland in metabolism. When a given constituent was maintained at a high level, it was found that changes in metabolism occurred which were not under the control of the pituitary gland or its associated endocrine structures. Some fundamental changes appeared to occur in the cells of the various tissues themselves.

The first step in adjustment of the organism is in the digestive system. When high-fat or high-protein diets were fed to animals which had been on a stock diet in which carbohydrates predominated, there was, at first, a diarrhea with considerable loss of unchanged food material. However, after a few days this diarrhea ceased, and the efficiency of gastrointestinal function became equal to that on the original diet. In Table 1, the distribution of foodstuffs in the gastrointestinal tract is shown 2 hr. after a fat or carbohydrate meal had been fed to rats (1). It will be seen that the distribution of the different food stuffs was approximately the same on both diets either in the presence or absence of the pituitary gland. This study was made after the animals had been maintained for three weeks on the given diet.

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The absorption of foodstuffs when animals were maintained on the high-fat and high-carbohydrate diets for three weeks after the initial adjustment is shown in Table 2. Absorption was good in all cases.

The explanation of this adjustment has been given by Ivy and his co-workers (2, 3). They have shown that if an animal is continued on a given diet high in one major food factor, the proportion of the digestive enzymes in the pancreatic juices undergoes a change in favor of the predominant foodstuff. In some manner the metabolism of the secretory cells is changed so that more of the needed enzyme is produced.

The role of the liver in the adjustment to diet has been long recognized. In fact, it has been so closely connected with the interconversion of foodstuffs that there has been a tendency to consider it the sole organ involved in this transformation. It has been demonstrated to be the major, if not the sole, source of acetone bodies in the animal. These always appear in the blood and the urine in increased quantities when an animal is fed a high-fat diet or is fasted. But if the high-fat diet or the fasting is continued, there is a drop in the acetone body level.

Since, in the case of the high-fat diet the total metabolic rate remains the same, there must be a change in the metabolism of fat by the peripheral tissues. We find also that the blood sugar level and nitrogen balance in such animals is well maintained. Since there is no satisfactory evidence to prove the conversion of fat to carbohydrate, one may assume that the peripheral tissues are able to substitute fat for carbohydrate in their energy metabolism.

Changes in glucose and insulin tolerances also indicate that there is a fundamental change in the metabolism of the peripheral tissues in the fat-fed animal. The rate of fall of blood sugar after intravenous injection of glucose is decreased (Fig. 1) while the rate of recovery of the blood sugar level after injection of insulin (Fig. 2) is increased. This is best explained by a decreased utilization of glucose in the peripheral tissues (4, 5).

TABLE 1

Distribution of foodstuffs two hours after meal by stomach tube

DIET	NUMBER OF RATS	FAT			CARBOHYDRATE			NITROGEN*		
		In stomach	In small intestine	Absorbed	In stomach	In small intestine	Absorbed	In stomach	In small intestine	Absorbed
		%	%	%	%	%	%	%	%	%
High-carbohydrate diet										
Controls	8				25.0	4.8	70.2	37.5	21.3	41.2
Hypophysectomized	5				33.6	5.8	60.6	53.0	26.8	20.2
High-fat diet										
Controls	9	22.4	7.2	70.4				32.2	22.4	45.4
Hypophysectomized	5	28.4	10.4	61.1				46.6	24.9	28.5

* This nitrogen includes the nitrogen of the digestive juices.

TABLE 2

Absorption of foodstuffs during balance experiments

GROUP	NUMBER OF RATS	PERCENTAGE ABSORBED OVER BALANCE PERIOD		
		Fats	Carbohydrate	Nitrogen
High-carbohydrate diet				
Controls	9		98.6	81.9
Hypophysectomized	6		98.3	76.4
High-fat diet				
Controls	12	93.2		86.6
Hypophysectomized	7	89.1		86.5

Further evidence is supplied in the first experiment which drew the authors' attention to this problem. As shown in Table 3, whether an animal is hypophysectomized or not, the rate of disappearance of glycogen from the liver on fasting is much less if the animal is fed on a high-fat diet than if maintained on a high-carbohydrate regime (6). The rate of fall of the blood sugar level is also decreased. Similar observations have been made by MacKay (7) and Guest (8) if animals maintained on high-protein diets were compared with animals maintained on high-carbohydrate diets. While the liver glycogen was much higher and the blood sugar level equally high in the carbohydrate-fed animals before fasting, the amount after the fast was significantly lower than in the protein-fed animals.

While these studies indicated that there was a change in the metabolism of the peripheral tissues, the possibility that the liver was playing a role not heretofore definitely demonstrated still existed. This could be ruled out best by the use of the eviscerated rat.

When animals were placed on high-fat and high-carbohydrate diets in equicaloric quantities for a three-week period and then eviscerated, there was a marked difference in the rate at which glucose disappeared from the circulation (Fig. 3). In animals previously on a high-carbohydrate diet the blood sugar concentration dropped rapidly, and the animals died in hypoglycemic convulsions at an average time of 9 hr. If glucose were repeatedly injected as the blood sugar fell to low levels, such animals could be maintained for many hours longer. On the other hand, the blood sugar levels of the animals which had previously been on a high-fat diet fell very slowly and the animals died after an average time of 17 hr. with no convulsions and significant amounts of glucose still in their blood. Such animals could be revived by the injection of sugar and would survive a few hours longer but would die at approximately the same time as the repeatedly injected carbohydrate-fed animals. There was, therefore, a definite difference in the rate of utilization of glucose by the peripheral tissues of the animals on the two diets (9).

The adjustment to the high-fat diet apparently requires time. Another group of rats was placed on a high-fat diet for five weeks and then eviscerated. In these animals the blood sugar level fell more slowly and they survived for an average of 22 hr. without further administration of glucose.

The difference in survival was not due to a change in the total metabolic rate. Figure 4 shows the oxygen consumption of the different animals. As would be expected, there was a marked reduction in oxygen consumption when the viscera were removed, but there was no difference between rats on the high-fat or high-carbohydrate regimes.

Neither was the difference in the rate of disappearance of glucose and the survival of the animals previously on the high-fat diet due to the use of circulating acetone bodies. While these animals did have a somewhat higher level of acetone bodies in the blood at the time of evisceration, all significant amounts of these substances had disappeared in both groups by the time the first group of large blood samples was taken 5 hr. later. It was after this time that the rate of disappearance of glucose was most marked.

We have shown that there is a difference in the peripheral utilization of glucose which is not accounted for by any difference in metabolic rate or in the use of circulating acetone bodies, and that time seems to be a factor in the adjustment. We have,

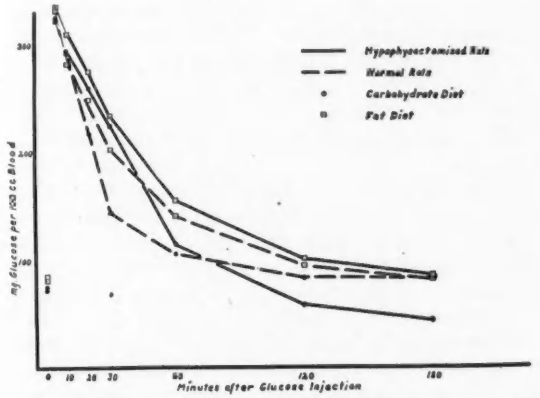

FIG. 1. *Average intravenous glucose tolerance curves of control and hypophysectomized rats on high-carbohydrate and high-fat diets. At zero time, 0.125 gm. of glucose per 100 gm. of body weight was injected into the saphenous vein.*

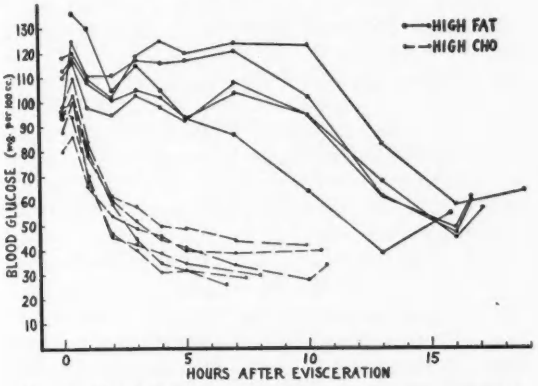

FIG. 3. *Blood glucose levels and survival times of eviscerated rats previously on high-carbohydrate and high-fat diets.*

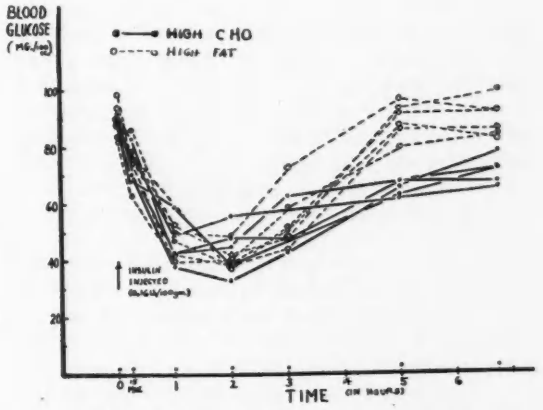

FIG. 2. *Diet and insulin tolerance of normal rats. Blood sugar curves of normal adult male rats injected with 0.16 U. of insulin per 100 gm. after 36 hr. fast. These animals had previously been fed equicaloric amounts of special diets by stomach tube for six weeks. Each curve represents one insulin test in one rat.*

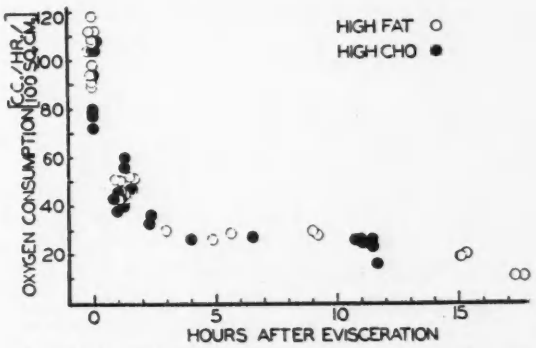

FIG. 4. *Oxygen consumption of eviscerated animals previously on high-carbohydrate or high-fat diets.*

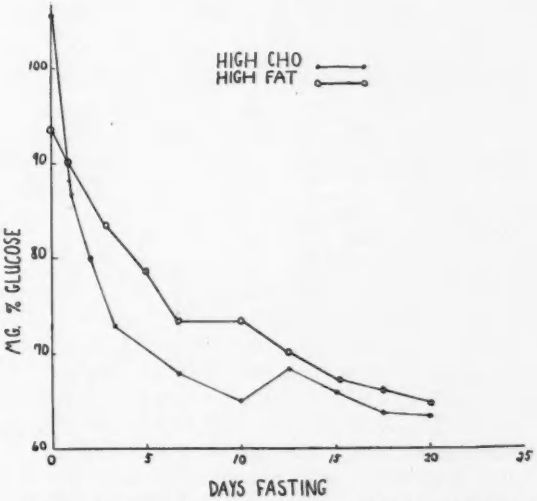

FIG. 5. *Average blood sugar levels during fasting of rats previously on high-carbohydrate or high-fat diets.*

therefore, adopted the hypothesis that there is a fundamental change in the enzyme systems of active cells which enables these cells to use more of the predominant foodstuff. This is supported by the evidence that the need for vitamins which take part in co-enzyme systems is affected by the type of diet fed. The need for thiamin, which is a constituent of co-carboxylase, is greatest on a high-carbohydrate diet and very low on a high-fat diet (10). A high-protein or high-fat diet apparently increases the need for riboflavin (11). This evidence would be in accord with a lower turnover and probably lower concentration of the co-enzyme systems involved. At present this relation of concentration of co-enzyme systems to diet is being investigated in this laboratory.

This change in cellular metabolism not only affects survival after evisceration, but it also affects survival during subsequent fasting. In Figure 5 the average blood sugar level during fasting of groups of animals originally on equicaloric high-fat and high-

carbohydrate diets is given. These rats were maintained on equicaloric amounts of the two foodstuffs together with adequate protein, mineral, and vitamin supplements for five weeks before the fast was begun. One sees the more rapid initial fall of blood sugar in the carbohydrate-fed group previously described. Although the blood sugar curves tend to approach each other, this initial difference is never eliminated and the high-carbohydrate animals die finally in hypoglycemia (12).

Thus far, we have been comparing the peripheral tissue changes due to high-fat diet. A high-protein diet or a period of fasting has similar effects on the utilization of glucose, but the mechanism of the changes appears to be different. Here again, the eviscerated animal has helped to elucidate the picture. Figure 6 shows the blood sugar curves and the comparative times of survival when animals were fed on a mixed diet up to the time of evisceration in comparison with animals which were fasted 48 hr. before evisceration. The fasted rats survived longer and maintained higher blood sugar curves (13). The same increased survival is shown in animals on a high-protein diet.

There are some differences, however, between the

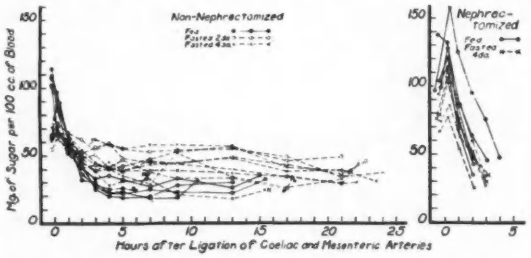
Non-Nephrectomized
Nephrec-tomized
Mg. of Sugar per 100 cc of Blood
Hours after Ligation of Coeliac and Mesenteric Arteries

FIG. 6. *The effect of fasting on the blood sugar curve of the eviscerated rat.*

fasted animals, those on the high-protein diet, and the rats on a high-fat diet. When rats were eviscerated after the high-fat diet, there was a slow fall of the blood sugar which, if it changed significantly, slowly increased with time. After fasting or a high-protein diet, however, the initial fall in blood sugar was almost as rapid as in the animals on a high-carbohydrate diet, but it soon leveled off at a higher value than the carbohydrate group and this level was maintained for many hours. Another difference between the latter two groups and the fat-fed animals was that removal of the kidneys eliminated the difference between the first two groups and the carbohydrate-fed animals. The blood sugar levels fell rapidly in the nephrectomized eviscerated animals previously on carbohydrate, protein, or fasting, and such animals died after 2 or 3 hr. in hypoglycemic convulsions. Nephrectomy did not eliminate the difference between the fat- and carbohydrate-fed animals, although the total length of survival was markedly reduced.

The experiments of Reinecke (14) demonstrated that the reason for the difference lay in the production of glucose by the kidneys of the fasted or protein-fed eviscerated animal. The glucose level of the renal vein was almost invariably higher than that of the arterial system when the eviscerated animals has been previously fasted. This difference was not present in carbohydrate-fed or fat-fed animals which were not fasted.

We do not yet know the substances from which glucose is formed by the kidneys of these rats, although certain compounds have been ruled out. The new carbohydrate does not appear to be formed from circulating amino acids, circulating lactic acid, or circulating acetone bodies. Neither is it produced from kidney glycogen. Since Russell and

TABLE 3

Liver lipids and glycogen in hypophysectomized and control rats fed equicaloric amounts of high-carbohydrate and high-fat diet

DIET	NUMBER OF RATS	FATTY ACIDS	NON-SAPONIFIABLE	GLYCOGEN	GLYCOGEN LOST DURING FASTING	MEAN MOLECULAR WEIGHT FATTY ACIDS	FAT IN CARCASS
		mg./100 gm. body weight	*mg./100 gm. body weight*	*mg./100 gm. body weight*	*mg./100 gm. body weight*		
High-carbohydrate diet							
Not fasted controls	9	241	8.3	140			
Not fasted hypophysectomized	6	98	10	108			
Fasted 30–33 hours, controls	9	224	7.7	2.5	137.5	279 ± 1.9	8.14
Fasted 30–33 hours, hypophysectomized	9	87	9.3	0.16	107.8	294 ± 2.0	13.23
High-fat diet							
Not fasted controls	9	585	10.9	95.6			
Not fasted hypophysectomized	6	245	16.8	51.3			
Fasted 30–33 hours, controls	15	529	12	19.7	75.9	286 ± 1.9	9.53
Fasted 30–33 hours, hypophysectomized	14	127	19.3	9.1	42.2	290 ± 1.8	10.8

Wilhelmi (15) have found that kidney slices can form carbohydrates from amino acids in vitro, it may be that kidney protein is being converted into glucose. Roberts has also found shifts in fat which may be related to this process (16).

So far we have discussed the adjustments which occur in the body when there is an adequate supply of protein and calories. The body also has means of adjusting to lack of these factors. The three processes which largely determine the need of protein and energy are growth, including reproduction, muscular activity, and basal metabolic rate. Growth and reproduction particularly require protein as well as increasing the total caloric need. If the organism is to survive when the supply of nutrients is reduced, these processes must be depressed.

Here the endocrine system enters the picture. Reproduction, growth, and basal metabolic rate are under the control of hormones of the pituitary glands, either directly or through the influence of these hormones on other endocrine glands. The pituitary gland is one of the first organs to show the effects of caloric or protein deficiency. In 1930 Mason and Wolfe (17) reported that the pituitary glands of female rats on subnormal food intake showed decreased gonadotrophic activity and cessation of the estrous cycle. The importance of caloric restriction in reducing pituitary gonadotrophic activity in the male was demonstrated by Moore and Samuels (18). They observed atrophy of the secondary sex organs of the male rat on a thiamin-deficient diet. This could be prevented by administration of pituitary gonadotrophic extracts. The same degree of atrophy could be produced, however, when the total food intake was limited to that of the thiamin-deficient animals but large doses of thiamin were administered. Such animals responded to similar doses of pituitary gonadotrophic extract. Thiamin, therefore, appeared to play only an indirect role through its effect on the appetite. If gonadotrophic extracts were administered, animals would die of inanition with tremendously hypertrophied seminal vesicles and prostate glands.

Guilbert and Goss (19) showed that caloric restriction was not the only factor involved. They fed female rats on diets containing different amounts of protein. If the protein level was below 7 per cent of the caloric content of the diet, there were irregularities and cessation of estrous cycles which could be restored by injection of minimal doses of gonadotrophic hormones.

There was the possibility that the effects of caloric restriction observed in the earlier experiments were really due to protein deficiency, since these experiments had all been carried on by limiting the total amount of a mixed diet. Recently, advantage was taken of the stomach-tube feeding techniques developed by Reinecke, Samuels, and Ball (20) to study the relation between protein level and caloric level in causing the decreased gonadotrophic function. Table 4 gives a summary of the results. Apparently, either caloric or protein restriction will cause reduced gonadotrophic function. Even when over 90 per cent of the calories of the diet were protein, the caloric restriction which caused a 22 per cent loss in weight over a five-week period was associated with castrate changes in the seminal vesicles and prostate. These could be restored by injections of gonadotrophic hormones.

TABLE 4

Effect of diet restriction on male secondary sex organs

DIET	WEIGHT CHANGE	SEMINAL VESICLES	PROSTATE
calories/100 sq.cm./day	%	*gm.*	*gm.*
Fat: 10; Protein: 2	−9	0.314	0.313
Fat: 13; Protein: 1	3	0.097	0.135
Fat: 1; Protein: 11	−22	0.120	0.165

Mulinos and Pomerantz (21, 22) have shown that the effects of inanition also cause reduced production of growth and adrenotrophic hormones. This appears somewhat later than the evidences of gonadotrophic hormone deficiency.

These observations in animals have a counterpart in observations among human populations in famine areas. Fertility is decreased and menstrual irregularities or amenorrhea are common in starving populations (23). One of the early effects on children is the decrease in growth (24). Apparently, the picture can be reversed on refeeding, except in the case of the gonadotrophic hormones during puberty. There is evidence that irregularities produced by inanition at this time may continue to greater or lesser degree throughout the reproductive period.

This reduction of the manufacture of the pituitary hormones when the intake of protein or total sources of energy is reduced must be viewed as a definite protective mechanisn of nature. By reducing the increase in population and limiting the mass of protoplasm to be maintained in those already existing, the chances of survival of the group are much better. We can, therefore, definitely class this as an adaptive mechanism.

SUMMARY

It has been demonstrated that the animal body has mechanisms of adaptation to wide variations in the intake of the different major foodstuffs. Adaptations to high-carbohydrate or high-fat diets apparently require time and involve the cells of the body as a whole. There is good reason to think there is a shift in the enzyme systems of the cells.

Adaptation to a high-protein diet or to consumption of endogenous protein during fasting apparently involves increased gluconeogenesis both in the liver and in the kidney. There does not seem to be the

same shift in the cells of the body as a whole which is observed on the high-fat diet.

The animal's body also adjusts to limitation in the amount of protein or amount of total calories available, apparently by reducing production of hormones in the pituitary gland. Limitation of gonadal function is usually observed first, followed by reduction in growth, adrenal, and thyrotrophic substances. Limitation in the production of these hormones decreases the protein and caloric demand and thus adapts the organism to the limitations of its dietary environment.

REFERENCES

(1) SAMUELS, L. T., REINECKE, R. M., AND BALL, H. A.: Balance studies in hypophysectomized and normal rats fed on equicaloric high carbohydrate and high fat diets. Endocrinology 31: 35, 1942.

(2) GROSSMAN, M. I., GREENGARD, H., AND IVY, A. C.: The effect of dietary composition on pancreatic enzymes. Am. J. Physiol. 138: 676, 1943.

(3) GROSSMAN, M. I., GREENGARD, H., AND IVY, A. C.: On the mechanism of the adaptation of pancreatic enzymes to dietary composition. Am. J. Physiol. 141: 38, 1944.

(4) SAMUELS, L. T., REINECKE, R. M., AND BALL, H. A.: Effect of diet on glucose tolerance and liver and muscle glycogen of hypophysectomized and normal rats. Endocrinology 31: 42, 1942.

(5) ROBERTS, S., AND SAMUELS, L. T.: Influence of previous diet on insulin tolerance. Proc. Soc. Exper. Biol. & Med. 53: 267, 1943.

(6) SAMUELS, L. T., REINECKE, R. M., AND BALL, H. A.: Liver fats and glycogen of hypophysectomized rats on high carbohydrate and high fat diets. Proc. Soc. Exper. Biol. & Med. 49: 456, 1942.

(7) MACKAY, E. M., CARNE, H. O., WICK, A. N., AND VISSCHER, F. E.: The relation of fasting ketosis in the rat to the preceding diet and the liver fat. J. Biol. Chem. 141: 889, 1941.

(8) GUEST, M. M.: Carbohydrate storage and mobilization in the rat. J. Nutrition 22: 205, 1941.

(9) ROBERTS, S., SAMUELS, L. T., AND REINECKE, R. M.: Previous diet and the apparent utilization of fat in the absence of the liver. Am. J. Physiol. 140: 639, 1944.

(10) EVANS, H. M., AND LEPKOVSKY, S.: Sparing action of fat on the antineuritic vitamin B. J. Biol. Chem. 83: 269, 1929.

(11) CZACZKES, J. W., AND GUGGENHEIM, K.: The influence fo diet on the riboflavin metabolism of the rat. J. Biol. Chem. 162: 267, 1946.

(12) REINECKE, R. M., ROBERTS, S., AND SAMUELS, L. T.: Unpublished.

(13) REINECKE, R. M., AND ROBERTS, S.: The effect of fasting on the blood sugar curve of the eviscerated rat. Am. J. Physiol. 141: 476, 1944.

(14) REINECKE, R. M.: The kidney as a source of glucose in the eviscerated rat. Am. J. Physiol. 140: 276, 1943.

(15) RUSSELL, J. A., AND WILHELMI, A. E.: Glyconeogenisis in kidney tissue of the adrenalectomized rat. J. Biol. Chem. 140: 747, 1941.

(16) ROBERTS, S., AND SAMUELS, L. T.: Previous diet and the role of the kidney in the metabolism of the eviscerated rat. Am. J. Physiol. In press.

(17) MASON, K. E., AND WOLFE, J. M.: The physiological activity of the hypophyses of rats under various experimental conditions. Anat. Rec. 45: 232, 1930.

(18) MOORE, C. R., AND SAMUELS, L. T.: The action of testis hormone in correction changes induced in the rat prostate and seminal vesicles by vitamin B deficiency or partial inanition. Am. J. Physiol. 96: 278, 1931.

(19) GUILBERT, H. R., AND GOSS, H.: Some effects of restricted protein intake on the estrous cycle and gestation in the rat. J. Nutrition 5: 251, 1932.

(20) REINECKE, R. M., BALL, H. A., AND SAMUELS, L. T.: High fat and high carbohydrate diets that can be fed to rats by stomach tube. Proc. Soc. Exper. Biol. & Med. 41: 44, 1939.

(21) MULINOS, M. G., AND POMERANTZ L.: Pseudo-hypophysectomy—a condition resembling hypophysectomy produced by malnutrition. J. Nutrition 19: 493, 1940.

(22) MULINOS, M. G., AND POMERANTZ, L.: Hormonal influences on the weight of the adrenal in inanition. Am. J. Physiol. 132: 368, 1941.

(23) ZIMMER, R., WEILL, J., AND DUBOIS, M.: The nutritional situation in the camps of the unoccupied zone of France in 1941 and 1942 and its consequences. New Eng. J. Med. 230: 303, 1944.

(24) STUART, H. C.: Studies of the nutritional state of children in unoccupied France in the fall of 1942. J. Pediat. 25: 257, 1944.

Better Breakfast Campaign

IN JANUARY, 1946, the Council on Nutrition of the Public Health Federation of Cincinnati conducted a Better Breakfast Campaign, which stimulated a gratifying degree of community interest. Eleanor R. Maclay, chairman of the Council on Nutrition, was one of the leaders in the local campaign. Mrs. Emily Hays Jones and Mrs. Marjorie Hall Siler acted as co-chairmen of the Better Breakfast Project Committee. To aid other communities which feel that need for an educational nutrition campaign, a full report of the methods, techniques, organization, and publicity used has been prepared and published in a paper-bound book through the courtesy of the Cereal Institute. This book is indeed a pertinent publication, for it contains information on the organization of committees and workers, cooperating community agencies, and commercial enterprises. In addition, actual samples of posters, charts, newspaper releases, radio scripts, and a play given by school children are included, together with notations as to the groups to whom they were distributed. Any organization looking forward to a similar campaign will find many hints and concrete suggestions to help in conducting a successful campaign.

Weight Reduction of Obese Women of College Age

I. Clinical Results and Basal Metabolism[1]

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THE DIETARY problems involved in weight reduction of college-age women have received little study even though dietary restriction for this purpose is common among this age group. Young women are acutely aware of the value of a slim, well-shaped figure both as a social and an economic asset. Accordingly, they restrict their diets, but in the manner prescribed for adults, which provides a marked reduction in calories. However, reduction in calories inevitably is accompanied by changes in other dietary components.

Nutritive needs are no less important than weight loss, and the nutritive needs of this age group appear to differ somewhat from those of adults. The physiological strain to which women of college age are subjected is reflected in the relatively high incidence of diseases such as tuberculosis, in which there is evidence of undernutrition as a predisposing factor (1). In the interval between childhood and adulthood the degree of maturity appears to vary with the individual, but for the average college-age woman the food intake should provide for a small amount of growth of skeletal and soft tissue (2) and for the accumulation of body stores which may be needed during menstruation (3) and childbearing (4).

The present investigation was planned to study a group of overweight students during weight reduction and the periods of weight maintenance before and after reduction. Questions to be answered were: How low must the caloric intake be to bring about a desirable rate of reduction in a moderately active college woman? What measurable effects do these dietary restrictions have on metabolism? What is the dietary outlook of a young woman whose weight has been reduced to normal? These questions have not been answered completely, but the data presented are offered as a contribution toward the solution of the dietary problems of this group.

The physiological relationships concerned in weight changes have been comprehensively reviewed by Bruch (5, 6, 7) and Newburgh (8), the former with special reference to children, the latter to adults. The trend of current thought appears as follows:

(a) Obesity is the result of an intake of energy greater than the output; weight reduction will result from sufficient reduction of intake.

(b) Control of energy intake in obese individuals is made difficult because of an unusually good appetite which becomes exaggerated in some unexplained way during periods of emotional strain.

(c) Basal metabolism, which may be below normal, but is usually normal or greater than normal in obese individuals, drops during reduction.

(d) An imbalance may exist between the autonomic nervous system and fat deposition. The metabolism of fat as a tissue and the intermediate metabolism of fat have received little study but the possible significance of these is suggested by a review of Wells (9).

Little has been recorded concerning the caloric intakes of obese college-age women, and the studies recorded vary in reliability and usefulness. Harrington (10) found no gain of weight during intakes of 2700 and 3200 calories per day or 22 and 25 calories per kg. of body weight per day in two test periods on a young woman 93 per cent overweight. Expressed as calories per kg. of ideal weight,[3] which may be a better statistical comparison of the intakes of obese

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[2] Now at Michigan State College, East Lansing.

[3] Because of the probable differences in metabolic rate of fat and muscle tissue, the basal metabolism of obese subjects is sometimes expressed on the basis of ideal rather than actual weight (16). In this case $\frac{2700 \text{ calories}}{123 \text{ kg., actual weight}} = 22$, $\frac{2700 \text{ calories}}{64 \text{ kg., ideal weight}} = 42$.

individuals with those of normal weight, the intake of this subject was 42 and 49 calories per kg., respectively, for the two periods. In other studies (11, 12, 13) in which caloric intakes were accurately determined, but the weight response was not recorded, three subjects, 22 to 32 per cent overweight, each consumed 36 calories per kg. of ideal weight per day. In another study (14, 15) in which trained college students made detailed estimates of their own intakes but no records of weight changes, the 16 overweight subjects were estimated to have consumed 23 to 41 calories per kg. of ideal weight, with an average of 31.4 calories.

Recent investigators of populations of college women have reported 1800 to 2200 calories, or 32 to 39 calories per kg., per day as the average intakes for the groups (11, 14). Weight changes were not reported, but weight and height changes that have been recorded for populations from other colleges (2) suggest that, on the average, under the current dietary pattern, little fat accumulation takes place at this age, and so the caloric intakes may be assumed to represent conditions for weight maintenance of normal young women. Individual studies of the caloric intake of normal women of college age (Table 1) suggest a slightly higher intake than that obtained from the studies quoted. Of the other obese subjects referred to, only two had consumed more than may be considered normal, but some with low intakes may not have been maintaining their weight at the intakes reported.

A lowered caloric intake for weight maintenance after reduction is suggested by the data reported by Harrington (10). After many weeks of weight reduction, the subject referred to above maintained her weight for one month on 32 calories per kg., an amount less than her pre-reduction requirement. It might also be noted in Table 1 that Subject *20*, who had the lowest intake without loss of weight, had been described as one who "ordinarily finds difficulty in preventing obesity." Although not obese at the time of the study, this subject may have been maintaining her weight at this low intake as a result of previous dietary restriction.

TABLE 1

Caloric intakes of individual college-age women of normal weight as compiled from the literature

INVESTIGATOR AND SUBJECT	DAYS ON ANALYZED DIET	AVERAGE CALORIES PER DAY		WEIGHT CHANGE DURING STUDY
		Total	Per kg.	
				kg.
Pittman *et al.* (11)				
Lu	56, consecutive	2045	35.6	−1.8
R	56, consecutive	2114	33.1	−1.5
M	56, consecutive	2093	40.0	0.4
O. M	67, intermittent over 6 months	2799	41.1	1.2
B. W	67, intermittent over 6 months	2292	40.4	−0.5
Coons and Schiefelbush (13)				
19	42, consecutive	2565	44.0	0.0
20	42, consecutive	1953	34.0	0.0

In summarizing the very limited information concerning food intake of obese college women, we find evidence that the caloric intake during maintenance of obesity may be high, although not conspicuously so, and that the maintenance intake following prolonged food restriction may be abnormally low. Thus, the woman with a tendency toward the accumulation of excess fat may find it difficult to eat, without undue gain, at the same table with those of normal weight.

Food intake represents energy intake; the other side of the energy balance involves energy output. Basal metabolism is obviously a significant factor in energy output. However, evaluation of basal metabolism data for the obese is difficult because the figures usually are expressed as a comparison to the basal metabolism of normal subjects. The basis of comparison, energy output per unit of surface area calculated from the height and weight of the subject, has been criticized by Evans and Strang (16) and others. According to Coons (17), the basal metabolism for obese subjects appears to be normal if calculated on the basis of absolute height and weight, high if based on absolute height and ideal weight, low if based on weight alone. Thus, the evidence for the normality of the basal caloric output of the obese rests with the standards of reference used, none of which may be accepted without qualification.

Both the absolute energy exchange and the components of the diet for weight control of the obese young woman need further study.

EXPERIMENTAL

Eight obese college girls served as subjects of the experiment. Physical examinations supplemented by basal metabolism tests demonstrated that the

TABLE 2

Height, age, and weight of subjects before reduction

SUBJECT	AGE	HEIGHT	ACTUAL WEIGHT	ESTIMATED OVERWEIGHT
	years	*in.*	*lb.*	*lb.*
1	22	65.3	174	52
2	19	63.8	138	15
3	18	62.3	156	26
4	19	63.3	164	34
5	20	65.0	165	35
6	19	66.0	170	30
7	20	67.0	179	29
8	19	61.6	137	17

group was essentially normal except with respect to weight. Data on weight are presented in Table 2, and the histories of the subjects may be found at the end of the article. Varying heights and body builds, including both mature and juvenile types of figures, were represented.

The plan of the experiment was to study the subjects in periods of weight maintenance before and after, as well as during weight reduction. By this means each subject served as her own control. For the pre-reduction period the subjects were asked to select a diet which conformed to their usual eating pattern and which, on the basis of their own experience, would provide enough calories to maintain their existing weight. For the purpose of reduction each subject was placed on a diet providing not less than 1000 calories. When optimal weight for height was reached, food calculated to provide 400 calories was added to the reduction diet. The data are not complete for Subjects *1* and *2* as the plan of the experiment was expanded after they were studied. The data for Subject *8* also are irregular because she ceased to lose before her optimal weight was reached. Her post-reduction tests were made during weight maintenance but without the 400-calorie increase in diet.

During the three periods all food was weighed and eaten under the supervision of trained personnel.

TABLE 3

Foods included in menus during a five-day period

REDUCTION DIET				POST-REDUCTION MAINTENANCE DIET, 1570 CALORIES*	
1000 calorie diet*		1200 calorie diet*			
	gm.		gm.		gm.
Orange juice	200		300		300
Whole orange	100		100		100
Tomato juice	200		100		100
Tomato soup concentrate	70		30		30
Grapefruit	100		200		200
Peaches, canned	100		105		200
Pineapple, canned	80		110		110
Banana†	100		100		100
String beans, canned	70		70		170
Beets, canned	70		90		90
Cabbage	100		100		100
Carrots	100		100		100
Lettuce	100		100		100
Onions	10	Rutabaga, raw	20		20
Celery	50		110		110
Tomato	70		190		190
Peas, canned	70		160		360
Potatoes, Irish	600		600		600
Squash, winter‡	100		100		100
Wholewheat bread	250		250		310
Wholewheat cereal, dry	100		100		100
Bacon	20		20		20
Lean meat	400		400		900
Salmon	90		90		90
Eggs, whole	150		150		650
Milk, 2% butter fat	2400		3140		3140
		Pear, canned	100		100
		Apple	230		230
		Dill pickle	20		20
				Graham cracker	5
Total protein	68		72		100
Total fat	25–37		30–42		50–60
Total carbohydrate	125		158		175

* Calories, protein, fat, and carbohydrate were calculated by food tables from weighed food intakes except in cases where the protein was estimated from the determined nitrogen values. The usual conversion factor, 6.25, was employed for this calculation.

† When available, otherwise 200 gm. orange juice was substituted.

‡ When available, otherwise 80 gm. carrots was substituted.

TABLE 4

Menus for five-day period (1200 calories per day)

MORNING	NOON	EVENING
First day		
	gm.	gm.
Grapefruit or orange juice 100	Bacon (cooked) 20	Lean meat 80
Oatmeal or 100	Tomato (raw) 40	Salad
Wholewheat prepared cereal 20	Whole wheat bread 60	Cabbage 50
Whole wheat bread 12	Celery curls 30	Celery 30
Milk, 2% butterfat 180	Peaches 75	Mashed potato 100
Coffee, if desired	Milk 200	Carrots (cooked) 80
		Custard
		Milk 120
		Egg 25
Second day		
Same	Lean meat 50	Lean meat 70
	Bun, enriched 40	Baked potato 100
	Lettuce 30	Green beans 70
	Dill pickle 20	Raw carrots 10
	Peas 70	Celery curls 10
	Orange 100	Baked apple 100
	Milk 200	Milk 200
Third day		
Same	Fish salad	Tomato juice 100
	Fish 30	Lean meat 80
	Egg 50	Potato 100
	Celery and lettuce 90	Baked squash 100
	Pickled beets 20	Pineapple 70
	Tomatoes (raw) 80	Milk 200
	Whole wheat bread 30	
	Raw carrot 10	
	Apricots 75	
	Milk 200	
Fourth day		
Same	Lean meat 50	Lean meat 70
	Tomato concentrate 30	Potato 100
	Peas 90	Beets 70
	Lettuce 60	Raw rutabaga 20
	Raw apple 100	Whole wheat bread 15
	Whole wheat bread 30	Milk 200
	Milk 200	Custard
		Milk 120
		Egg 25
Fifth day		
Same	Scrambled egg 50	Fish 60
	Potato 100	Potato 100
	Lettuce 20	Stewed tomato 70
	Pear 100	Cabbage (raw) 50
	Milk 200	Mixed fruit 100
		Whole wheat bread 15
		Milk 200

The caloric content of the weighed diets was calculated by the use of food tables. In planning the reduction and post-reduction diets the basal diet list of McKay *et al.* (18) was used, with an amount of milk chosen to provide an intake of calcium and nitrogen previously found to be consistent with small daily retention of these elements. A list of foods included in the five-day routine and the set of menus are presented in Tables 3 and 4. Subjects were required to eat all of the food served, and no food was allowed *ad libitum* except calorie-free condiments and beverages. The diet contained average quantities of potatoes, whole-grain bread, and milk; thus, except for the limitation of sweets and fats and the addition of fruits and vegetables, it demanded little modification of the dietary pattern accepted by this age-group. This choice of foods has this practical advantage: if low calories are to be maintained over a period of time, such a dietary pattern simplifies the living problems of the obese person and lessens the temptation to eat restricted foods.

The ability to maintain normal weight after reduction was investigated by a questionnaire answered by six of the subjects nine to 24 months after discharge from the diet table.

The study of energy exchange in the basal state during the three experimental periods was carried out by both the open and closed circuit methods, with standard laboratory equipment and techniques (19). The metabolism tests were made, on the average, 71 days after the beginning of the reduction period, and 24 days after the beginning of the post-reduction period—in no case earlier than 10 days after the beginning of a period. Some subjects were tested two or three times during a period.

RESULTS AND DISCUSSION

A typical graphic record of weight reduction for Subject *4* is presented in Figure 1. The records for the others are available for inspection (20). The caloric intake and weight response of each subject are presented in Table 5.

During the pre-reduction period the caloric intakes selected by the subjects were 20 to 33 calories per kg. of ideal weight. The relatively low intakes of Subjects *1* and *2* are believed to have been caused by the difficulty of selecting their diets from unusually bulky foods; but the weight response of these subjects does not suggest that the caloric intake was much less than the amount required for weight maintenance. Three of the subjects exactly maintained their weight; four lost less than ½ lb. per week; and only one lost a significant amount. Thus, weight maintenance was approximately supported by less than the 32 to 40 calories consumed by the average young woman of normal weight.

For the reduction period the caloric intakes of the individual subjects were 16 to 22 calories per kg. of ideal weight. The weight losses in all cases were prompt, continuous, and at a desirable rate. The regularity of the weight losses was unusual for reduction by dietary restriction only and is believed to be due to the constancy and balance of the specific nutrients supplied by the five-day dietary regimen. There was no evidence of water retention even at the beginning of the reduction routine. Thus, the weight losses probably more nearly represent loss of body tissue than those often obtained (8). The individual mean losses were 1.7 to 2.0 lb. per week for all subjects except the two small women with immature figures. For them, the losses averaged 1.1 lb. per week.

Although with two exceptions there were no changes in the constituents and amounts of the diets, the rate of weight loss decreased during the course of reduction. For instance, Subject *7* lost an average of 2.1 lb. per week during the first four weeks of the reduction routine and 1.2 lb. per week during the last four weeks.

The weight response of Subject *8* was atypical of the group but is similar to cases reported in the literature (21). She lost 2 lb. per week regularly for the first 6 weeks; then the rate decreased; and after 12 weeks, her weight became stationary. This continued for 14 weeks, and in spite of a lowered caloric intake (see Table 5), losses were not resumed until one grain of thyroid per day was prescribed by the physician in charge. It is interesting that, after 10 weeks of constant weight, an increase of 350 calories per day for a period of two weeks brought no change in weight. The basal metabolism will be discussed later.

The other diet which was changed during the reduction period was that of Subject *6*. During the seventh week of the diet her intake was raised from 18 to 20 calories per kg. because her appearance suggested that she was losing weight too rapidly.

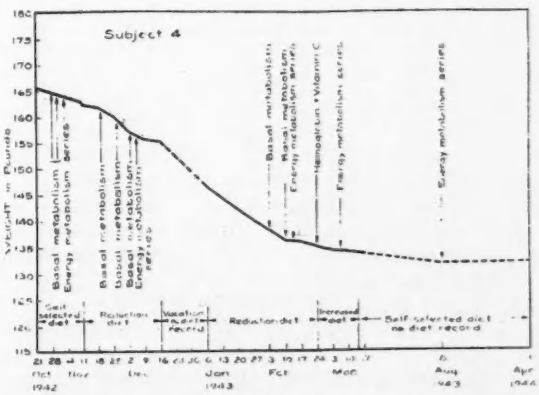

FIG. 1. *Weight graph. The dotted portions in the curve indicate periods for which there were no weighed food records. Energy metabolism series was a series of tests under varied conditions. The data from the basal test only is included in this paper.*

TABLE 5

Summary of caloric intakes and weight changes during all periods

SUBJECT	ENERGY INTAKE			WT. CHANGE PER WEEK	LENGTH OF PERIOD
	Total per day	Per kg. per day			
		Calculated on actual wt.	Calculated on ideal wt.		
Period I: Pre-reduction, self-selected diet					
	calories	*calories*	*calories*	*lb.*	*weeks*
1	1227	15.3	20.5	−0.2	4.0
2	1238	19.3	21.8	0.0	2.5
3	1736	24.4	31.1	0.0	3.0
4	1834	24.4	32.2	−0.3	2.5
5	1780	25.0	30.2	−1.0	4.0
6	2000	25.8	31.7	−0.4	4.0
7	1900	23.4	27.9	−0.3	2.5
8	1800	29.0	32.7	0.0	4.0
Period II: Low-caloric reduction diet					
1	1000		16	−1.8	20
2	1000		18	−1.1	18
3	1200		20	−1.8*	12
4	1200		20	−2.0	15
5	1200		20	−2.0	13
6	1200		18	−1.7	12
	1276		20		
7	1200		18	−1.9	13
8	1200		22	−1.1	12
Period III: Post-reduction controlled diet for the maintenance of weight					
3	1570		26	0.0	2.0
4	1570		26	−0.4	3.0
5	1570		25	−0.6**	7.0
6	1570		23	−2**	2.0
7	1570		22	0.0	4.0
8	1150		20	0.0	1
	1100		19	0.0	2
	1025		18	0.0	7
	1375		25	0.0	2
Period III: Post-reduction self-selected diet					
1	1900		32	+45†	
2	2400		43	0†	
3	1500		25	+10†‡	
4	1400		24	0†	
5	1500		22	0†	
6	2700		42	+13†‡	

* Weight change during Christmas vacation omitted.

** 4 lb. loss in one week. Stools suggested water rather than fat loss.

† Total weight change on self-selected diet.

‡ Weight stationary at the time this record was taken.

The individual caloric intakes for the controlled post-reduction period ranged from 22 to 26 calories per kg. Although these intakes represent a substantial increase over the reduction diets, they are still below the average for college-age women. No weight was gained by any of the subjects during this period. Although some weight losses took place in the post-reduction period, two sharp losses were coincident with a mild unexplained diarrhea and probably represent losses of water rather than fat. A longer time for this dietary period would have been desirable but was not possible.

The results recorded in the questionnaire nine to 24 months after the conclusion of the experiment included a record of one day's food consumption. Since the food intake was not weighed, the data are admittedly an estimation of food habits, but since the food and weight histories correlate, they are considered to be fairly reliable.

Three subjects had maintained normal weight, two with a relatively low caloric intake, the third with a relatively high one, but the latter under conditions of a high degree of activity. The other three had gained varying amounts of weight (Table 5), one to her pre-reduction level. This tremendous gain had taken place chiefly in the second year after leaving the experiment. The subject explained that she had been unhappy in her work and found it impossible to keep from increasing her eating. Her sample menu suggested at least partial abandonment of the restraint she had formerly exercised. Another subject had gained 9 lb. soon after discharge from the experiment, but had maintained her weight without much difficulty after that. The other subject was eating amounts in the upper range of normal for the active college woman and was gaining. From this it would seem that following loss of weight, 22 to 32 calories per kg. or approximately 1500 calories per day is the caloric average for weight maintenance of college-age women unless energy output is considerably increased.

From the clinical viewpoint, the results of reduction were satisfactory. Fat pads were reduced to normal proportions with marked improvement in general appearance. Two subjects, however, whose legs had been very heavy below the knee, lost very little from the calf and ankle but otherwise were reduced satisfactorily.

The subjects appeared to be in excellent health throughout the experiment and in the nine to 24 months which followed. During the controlled part of the study there was no extension of dental caries. The skin of two subjects, which showed a mild chronic eruption at the beginning of the experiment, cleared without specific treatment. Hemoglobin and erythrocyte counts remained normal, although in two subjects there was some tendency for the red cell count to drop toward the lower limits of normal toward the end of reduction. Plasma ascorbic acid values also were within the range of normal. Menstruation was interrupted for two months at the end of the reduction period in Subjects *4*, *6*, and *8*. The latter was the only clinical finding which suggested a lowering of the general state of nutrition.

The basal metabolism of the subjects is reported in Table 6. It has been expressed as calories per 24 hr. to avoid the use of arbitrary standards. During weight reduction, the mean 24-hr. basal metabolism for the period decreased from the pre-reduction values. All except Subject *4* had a lower basal metabolism after some weight losses had taken place, although the sampling was not done at a consistent point in the reduction routine. All subjects showed a depressed metabolism in the post-reduction period. The averages, 1175 and 1216 calories, found for subjects of this study during the reduction and post-reduction periods are also lower than the basal output of 1368 calories per day reported by Young for a cross section of Iowa College women. If the work of Briard *et al.* (24) can be interpreted to mean that the energy cost of work decreases with a decreased basal metabolism, these figures have added significance. The failure of the basal metabolism to rise after reduction is surprising, in view of the large increases of protein in the diet (Tables 3 and 4).

It is interesting to note (Table 6) that the basal temperatures and pulse rates also decreased. These findings seem to confirm the reports of Short and Johnson (25), although in their study the change was a reduction to normal from a previously elevated state. The basal respiratory quotients in this study were essentially unchanged during the three dietary periods.

Progressive reports of basal metabolism during reduction were not obtained, but if the depression in metabolism reported above can be assumed to be progressive, it would explain the gradual flattening seen in all of the weight curves. The decrease in rate of weight loss began nine to 14 weeks after the beginning of weight reduction except for Subject *8*. In her case, although the rate of weight loss began to decrease after six weeks and ceased after 12 weeks, her basal heat production did not appear to be depressed more than that of the others. As was noted above, thyroid was effective in initiating further weight losses.

Changes in the dietary habits of these subjects were variable. During the reduction regimen unfamiliar foods were encountered by all subjects and in most cases were eaten with relish after a few repetitions of the five-day diet. One subject learned to drink milk, and several added one or more vegetables to their list of "liked" foods. The subjects who were successful in maintaining normal weight after the end of the experiment stated that a low food intake had become habitual and caused little hardship although they consciously restricted both fats and sweets. There was no reported craving for fats, but certain subjects retained a taste for sweets and stated that occasional inclusion of cookies or ice cream added to their satisfaction.

The outlook for these individuals is more complicated than is often realized. From the data it appears that the problem is more than one of controlling caloric intake during reduction. Unless activities are significantly increased or unless medical science finds some means of effectively and innocuously stimulating metabolism, the subject must become habituated to less than the average food intake for women of her age. For adaptation to her post-reduction diet the formerly overweight young woman needs training or skilled help. It would appear, therefore, that the diet during reduction should be planned not only to reduce weight but also to educate the tastes and to provide some understanding of food values, preparation, and food selection. The five-day routine of this experiment limited the possibilities for training the subjects in food composition and selection to the foods included in the diet, and did not solve future problems in providing variety in low caloric menus and selection of food on social occasions. A further suggestion

TABLE 6

Mean basal calories, pulse, respiration, and oral temperature before, during, and after weight reduction

	SUBJECT	NO. OF TESTS	BASAL CALORIES PER 24 HR.	PULSE	RESPIRATION	TEMPERATURE
Period I:	1	1	1471	74	12	98.4
Pre-reduction, self-selected diet	3	3	1379	60	15	97.1
	4	2	1358	62	13	97.7
	5	2	1481	64	8	97.8
	6	4	1498	68	19	97.3
	7	3	1387	60	12	97.5
	8	3	1270	68	14	97.6
*Average**			1421	64	13	97.6
Period II:	1	1	1262	65	12	97.6
Low-caloric reduction diet	2	1		61	12	97.0
	3	2	1176	58	14	98.0
	4	7	1363	57	11	97.5
	5	1	1260	56	8	97.6
	6	1	996	60	17	97.2
	7	2	1234	52	9	
*Average**			1175	56	14	97.5
Period III:	3	1	1039	59	13	
Post-reduction controlled diet for the maintenance of weight	4	2	1289	55	10	97.2
	5	2	1274	54	12	97.3
	6	1	1217	52	17	97.0
	7	1	1262	53	11	
	8	4	1178	60	17	97.3
*Average**			1216	54	13	97.2
Mean for Iowa State College women (22, 23)			1368	67	15	97.7 ±0.3

* Averages of values for Subjects *3*, *4*, *5*, *6*, and *7*.

for the reduction and the post-reduction diet would be the introduction of some easily-limited sweet which would satisfy without adding significantly to the caloric intake.

SUMMARY

The problems of weight reduction of college-age women were studied by observing the response in body weight and basal metabolism to weighed food intakes *before*, *during*, and *after* weight reduction.

Seven of the eight subjects were reduced to normal weight at the rate of 1.1 to 2.0 lb. per week by a diet which supplied approximately one half of the average caloric intake of the college-age woman. In the overweight condition before reduction, seven approximately maintained their weight by intakes below average. Following weight reduction, an increase of the diet to three fourths of the calories ingested by an average college-age woman brought about decreases in weight loss but no weight gains.

Reports from six of the subjects nine to 24 months following the end of the experiment indicate that a relatively low caloric intake must be maintained indefinitely unless activity is significantly increased.

Basal metabolism tests which were made in each period showed a reduction of the basal rate during the reduction and post-reduction periods.

CASE HISTORIES

Subject *1*, a senior, presented herself for weight reduction to make a more attractive appearance in her search for employment. The excess weight was accentuated by narrow shoulders, broad hips, and a swaying gait. The face was slightly marred with acne but the teeth were in good condition with few fillings present. The subject had been obese since early childhood and had no idea of the cause of her original abnormality of weight. The subject had never menstruated but late onset of menstruation was characteristic of the women of the family, and, since the obesity dated from childhood, it was not believed related to the amenorrhea.

At the end of the experiment the main objectives appeared to have been attained. The fat pads of the scapular region were gone, loss of fat from the legs permitted a normal gait, and the general appearance was vastly improved.

During the next year when she was happily adjusted to her employment, the subject maintained her reduced weight, but during the second year, an unhappy one, excesses in eating were admitted and weight increased to the pre-reduction level. The typical menu which was submitted included such items as "pie a la mode" and "chocolates between meals." The morale, developed during reduction, seemed completely broken.

Subject *2* considered herself too chubby for her best social interests. She was well proportioned and only slightly overweight. The skin was clear but the teeth were in poor condition, contained many fillings and several teeth had been extracted. Menstruation was normal with onset at 13 years. The only significant finding in the history was frequency of upper respiratory infections. The subject had no idea of the cause of obesity, which had been present since early childhood, but poor nutritional habits might be suggested from the dental condition and repeated infections.

After leaving the experiment, weight losses were maintained and the subject was in good health except for minor colds and one case of influenza. From the menu submitted, the calculated caloric intake, while appearing relatively high for this subject, was explained by a 12-hr. working day. The menu appeared well chosen and included few concentrated, high-caloric foods.

Subject *3* appeared solidly built with good muscular development. Her moderate excess of weight, although rather evenly distributed, was accentuated by a concentration from knee to ankle. The skin was clear and teeth in excellent condition. Cod liver oil and high vitamin food had been included in the childhood diet. Menstruation began at 10½ years and continued normally. Obese since infancy, this subject's development appeared to follow the pattern of accelerated development described by Bruch (5).

Discouraged because weight reduction had not influenced the size of her legs in proportion to the other weight losses, Subject *3* left the experiment in a rather defiant mood which resulted in regaining part of the weight lost. Since that time the diet has been restricted, especially between meals, without change of weight. Health has been excellent since weight reduction.

Subject *4* had a large bony framework which fairly well concealed the excess weight distributed in the hips, waist, and large pendant breasts. Only fair muscular structure was indicated from tests of strength. The skin was clear, the current mouth condition good, but there were many fillings in the teeth. Menstruation was uneventful and regular, with onset in the 13th year. The subject, daughter of a prosperous physician, reported ample early feeding including cod liver oil. Obese since early childhood, the subject had always been favored by the parents because of a congenital hip defect which although essentially corrected had required extensive hospitalization between one and three years of age and limited activities for some time after that. The condition of the hip was markedly improved by the weight loss.

Weight has been maintained at the reduced amount only by a policy of "no salad dressing, no butter except on toast, milk for a filler if the dormitory menu is high-caloric, and black coffee, only, between meals." Excesses in eating, having brought about temporary weight gains, have been abandoned.

Subject *5* looked more mature than her stated age. The skin was clear and beautiful, but the teeth contained many fillings and several had been extracted. Musculature, both by appearance and strength test, seemed only moderately developed. The distribution of excess fat was uniform. Menstruation had begun at 12 years and had been regular and fairly profuse. Obesity had been present since infancy. The only suggestion which the history gave of the cause of obesity was that the subject was reared on a highly successful midwestern farm where the parents took pride in the growth of their children as well as their stock.

Weight reduction brought about changes in body proportions of Subject *5* resulting in a more youthful appearance. Since the termination of the experiment, the subject states that all of her desires for food have been satisfied without weight gain; however, inspection of the menu submitted indicates that the subject's desires for food, although including butter, ice cream, and soft drinks, are conservative.

Subject *6*, although of approximately the same height and weight as Subject *5*, presented a markedly different appearance. In spite of broad shoulders, most of the excess weight was concentrated below the waist. Excellent development of musculature was evidenced by tests of strength. Evidence of a mild degree of acne was present and increasing when the experiment began. The teeth contained many fillings, two were pulpless, and the occlu-

sion was poor. Obesity began at age 16 following a prolonged upper respiratory infection which resulted in a loss of 8 lb. Attempts to stimulate the subject's appetite resulted in regaining the weight lost and as well as an additional gain. During the following winter the subject gained 32 lb., part of which was lost during the summer on the farm. During the next winter 17 lb. had been gained before the experimental reduction was begun.

The results of weight reduction were somewhat disappointing. The losses were so largely confined to the upper part of the body that reduction was stopped before optimal weight was reached. Weight gain since the experiment was attributed partly to irregular between-meal eating while working on a night shift. The general health of Subject *6* has been excellent.

Subject 7 was a tall girl with well developed body enhanced by perfect carriage. Heavy bone and muscle structure as well as excess fat was suggested. The skin was clear. The teeth were in excellent condition, with only two fillings of recent date. Reared on an Iowa farm, the subject had indulged in a great variety of outdoor exercises and had been supplied with an abundance of food. Always above average in height but never obviously obese, the subject was the frequent recipient of health prizes. Menstruation began at 12 years, and, was regular and moderate in duration and amount.

Measurements revealed that the weight loss had taken place over the whole body.

Subject *8* had a small, chubby, juvenile figure. Musculature was moderately well developed, skin clear, and teeth excellent. The subject always has been slightly chubby but only recently became overweight to the present extent. The father, of Scandanavian descent, was a large man; the mother, of English extraction, had a small, trim figure which, however, was maintained only by some restriction of diet. Report of early feeding specified the use of cod liver oil and an abundant and well chosen diet. Menstruation began at the age of 12 and was regular and moderate. During the first year of college, although the subject continued to eat at home, she noted an increased appetite which she satisfied completely, believing energy expenditure had been equally increased as a result of additional walking. Gain of 17 lb. during the year prompted the subject to apply for weight reduction.

REFERENCES

(1) Getz, H. R., and Koerner, T. A.: Vitamin A and ascorbic acid in pulmonary tuberculosis. Am. J. Med. Sci. 202: 831, 1941.

(2) Donelson, E. G., Ohlson, M. A., Watt, B. K., Patton, M. B., and Kinsman, G. M.: Physical measurements of college women. Am. J. Dis. Child. 66: 21, 1943.

(3) Ohlson, M. A., and Daum, K.: A study of the iron metabolism of normal women. J. Nutrition 9: 75, 1935.

(4) Ebbs, J. H., Tisdall, F. F., and Scott, W. A.: The influence of prenatal diet on the mother and child. J. Nutrition: 22: 515, 1941.

(5) Bruch, H.: Obesity in childhood: Physical growth and development of obese children. Am. J. Dis. Child. 58: 457, 1939.

(6) Bruch, H.: Obesity in childhood: Basal metabolism and serum cholesterol of obese children. Am. J. Dis. Child. 58: 1001, 1939.

(7) Bruch, H.: Obesity in childhood: Energy expenditure of obese children. Am. J. Dis. Child. 60: 1082, 1940.

(8) Newburgh, L. H.: Obesity. Arch. Int. Med. 70: 1033, 1942.

(9) Wells, H. G.: Adipose tissue, a neglected subject. J. A. M. A. 114: 2177, 2284, 1940.

(10) Harrington, M. M.: Appetite in relation to weight. J. Am. Dietet. A. 6: 101, 1930.

(11) Pittman, M. S., McKay, H., Kunerth, B. L., Patton, M. B., Edelblute, N., and Cox, G.: The caloric intakes of 27 college women. J. Am. Dietet. A. 18: 449, 1942.

(12) Pittman, M. S.: Personal communication

(13) Coons, C. M., and Schiefelbusch, A. T.: The diets of college women in relation to their basal metabolism. J. Nutrition 5: 459, 1932.

(14) Greenwood, M. L., and Lonsinger, B. N.: Food intake of college women: Caloric intake and energy requirement. J. Am. Dietet. A. 20: 524, 1944.

(15) Greenwood, M. L.: Personal communication.

(16) Evans, F. A., and Strang, J. M.: The treatment of obesity with low caloric diets. J. A. M. A. 97: 1063, 1931.

(17) Coons, C. M.: Basal metabolism in relation to nutritional status. Am. J. of Physiol. 98: 698, 1931.

(18) McKay, H., Patton, M. B., Ohlson, M. A., Pittman, M. S., Leverton, R. M., Marsh, A. G., Stearns, G., and Cox, G.: Calcium, phosphorus and nitrogen metabolism of young college women. J. Nutrition 24: 367, 1942.

(19) Dubois, E. F.: Basal Metabolism in Health and Disease. Philadelphia: Lea & Febiger, 1936.

(20) Brown, E. G.: Nutritional status of Iowa State College women: Nitrogen, calcium, and energy exchange during weight reduction. Unpublished Ph.D. thesis, Iowa State College, 1944.

(21) Lauter, S.: Uberdie beziehungen zwischen energiehausalt, wasserhaushalt und gewicht bei fettsucht. Klin. Wchnschr 5: 1696, 1926.

(22) Pittman, M. S., Cederquist, D., Kunerth, B. L., Shinkle, V., Ohlson, M. A., Young, C. M., Donelson, E., Wall, L. M., McKay, H., Patton, M. B., and Kinsman, G. M.: The basal metabolism of midwestern college women. Am. J. Physiol. 140: 33, 1943.

(23) Young, C. M.: Nutritional status of Iowa State College women. Unpublished Ph.D. thesis, Iowa State College, 1940.

(24) Briard, S. P., McClintosk, J. T., and Baldridge, C. W.: Cost of work in patients with hypermetabolism due to leukemia and to exophthalmic goiter. Arch. Int. Med. 56: 30, 1935.

(25) Short, J. J., and Johnson, H. J.: Increased metabolism of obesity. J.A.M.A. 106: 1776, 1936.

Synthetic Cinnamon Flavoring

Announcement was made at the American Chemical Society meeting in September that a substitute for cinnamon flavor has been obtained from waste oat hulls. Dr. Carl Bordenca, Southern Research Institute, Birmingham, reported experiments with 16 possible cinnamaldehyde substitutes, five of which were found to yield cinnamon-like tastes. The most promising was furanacrolein, a product derived in two simple steps from waste oat hulls.

Weight Reduction of Obese Women of College Age

II. Nitrogen, Calcium, and Phosphorus Retentions of Young Women During Weight Reduction[1]

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OBESE young women between the ages of 18 to 25 years, motivated by a desire to present trim, attractive figures, frequently make drastic reductions in their food intakes. Clinically, the most generally advised reduction routine (1, 2) is that devised for the adult which provides decrease in fat, decrease in carbohydrate, marked increase in fruits and vegetables, and either no change or a slight increase in protein. The advisability of such a dietary at an age when nutrients are required not only for adult metabolism but also for the final stages of growth and for stores for childbearing seems questionable. Likewise, the maintenance of a positive nitrogen balance during weight reduction has been accepted on a relatively small amount of evidence (3, 4) limited to adult subjects. Accordingly, this study was planned to ascertain the retentions of nitrogen, calcium, and phosphorus during weight reduction of a group of college-age women. Although phosphorus usually is assumed to be in abundance in man's diet, the restrictions of cereal in reduction diets suggested the need for the study of phosphorus retentions.

It would appear that the retention of nitrogen and minerals during weight reduction may be dependent on several factors. The importance of the carbohydrate intake in sparing nitrogen has been demonstrated by Jansen (5). Keeton and Dixon (3) contend that in obese subjects, body fat also has a nitrogen-sparing action. Increases in fecal nitrogen were reported to result from the daily addition to the diet of one serving of a green vegetable which had a low coefficient of digestibility (6). An adverse influence of cellulose on calcium and phosphorus absorption and retention also has been reported (7). The low fat content of reduction diets might be expected to benefit the retentions since low fat in the diet retards stool passage (8) and therefore more nearly complete absorption of nutrients might be expected. On the other hand, moderate amounts of fat have been shown to promote calcium absorption by increasing intestinal acidity and thereby making calcium more available for absorption (9). The production of ketones would be expected to interfere with calcium retention but, even with diets as small as 600 calories, acidosis is infrequent (1).

A further factor in nitrogen, calcium, and phosphorus retentions is the relationship of these three nutrients in the metabolic mixture. Stearns (10, 11) has pointed out that in the body of the infant (a) one part of phosphorus is combined with approximately two parts of calcium in skeletal tissue, (b) one part of phosphorus with 17 parts of nitrogen in soft tissue, and furthermore, (c) that a food such as cow's milk containing these nutrients in the same proportions provides optimal conditions for growth. She reported that an intake of phosphorus in less than the theoretical amount required for combination with the absorbed calcium and nitrogen caused an increased excretion of calcium in the urine. Hawks *et al.* (12) also demonstrated the importance of phosphorus in the diet for optimal nitrogen and calcium retention in growing children.

Information concerning the composition of the adult body is limited. The analysis of one male adult (13) indicated that phosphorus was combined with 2.28 parts of calcium in the skeleton and with 32 parts of nitrogen in the soft tissues of the body.

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The relation of nutrients in the body of the well-nourished young woman in the late stages of adolescent growth is an open question.

The retention of nitrogen, calcium, and phosphorus by the college-age woman of normal weight was studied by McKay *et al.* (14) under conditions comparable with this study.

EXPERIMENTAL

The plan of the experiment has been described in the preceding paper. In brief, eight healthy college-age women, 11 to 32 lb. overweight, were reduced to average proportions and approximately average weight for height and age by diets of 1000 or 1200 calories. Weighed diets were prepared by trained attendants and served under supervision.

To provide controls for the reduction period the study was divided into three parts: (a) self-selected diet conforming as far as possible to the subject's previous dietary pattern, but with the number of calories restricted to an amount that would just maintain the subject's current weight; (b) the reduction diet; and (c) the reduction diet supplemented by the number of calories that would maintain the subject's reduced weight. As the plan was expanded after the experiment was begun, the early subjects were not studied in all three periods.

The addition of calories chiefly in the form of protein in the post-reduction period was suggested by the poor tissue tone of the first subject for whom a post-reduction study was made.

Constant weight was maintained during the pre-reduction period by all of the subjects except Subject *5*. In all cases, weight losses took place steadily from the beginning of the reduction diet. In the post-reduction period weight maintenance was established for all of the subjects except Subject *6*, and the weight loss which occurred in this subject was concurrent with a mild diarrhea and might reasonably be attributed to water rather than fat loss.

Nitrogen, calcium, and phosphorus retentions were determined from a seven-day sample (McKay *et al.*, 15) of the intake and excreta during the three periods. In the pre-reduction period the sampling was started after 12 to 19 days of controlled diet; in the reduction period, 22 to 107 days after the diet was instituted; and in the post-reduction period, from 3 to 22 days after the beginning of the period. Although a longer time before making the determinations would have been desirable in the last period, it was not feasible.

METHODS

The reduction diet, described in the preceding paper, consisted of specific amounts of certain readily available meats, cereals, fruits, and vegetables to be repeated in a five-day cycle. The basal diet list plus 500 ml. of milk per day yielded about 1000 calories, and provided the allowances of calcium and nitrogen recommended by the National Research Council (16), the Sherman recommendation for phosphorus (17), and adequacy in other known essential nutrients. This diet, which was calculated to contain 125 gm. of carbohydrate and 28 gm. of fat, was used for Subjects *1* and *2*. A higher caloric intake in the pre-reduction periods of Subjects *3* to *8* indicated that a 1200-calorie diet would bring about weight reduction. Accordingly, 150 ml. of milk and two servings of fruit or vegetables were added to the 1000-calorie diet for Subjects *3* to *8*.

The foods and liquids were sampled by obtaining an aliquot as the food was served. These aliquots were preserved and pooled for a seven-day period. Feces, marked by carmine, were pooled for the same period. Aliquots of urine for the seven days also were preserved. All of the samples were digested with hydrochloric acid according to the method of Stearns (18). Nitrogen was determined by the macro-Kjeldahl method. Calcium and phosphorus were determined from a wet ash prepared by the method of Stearns (18). A modification of the McCrudden method as described by Stearns (18) was used for determination of calcium; the Fiske and Subbarrow (19) method was used for phosphorus.

Ketones in the urine were determined by the Denige's reagent method (20).

RESULTS

Intakes and retentions of nitrogen, calcium, and phosphorus of the individual subjects are presented in Tables 1, 2, and 3. The intakes in all periods were greater than the amounts which normally provide retention, as reported by McKay *et al.* (14), and in most periods the intakes exceeded the allowances recommended by the National Research Council (16).

The mean of the group retentions, as well as the number of subjects retaining nitrogen, calcium, and phosphorus, was poorer during weight reduction than during the pre-reduction period, and it was even poorer during the post-reduction weight-maintenance period, in spite of increased nitrogen and phosphorus intakes.

In Table 4 the retentions found in this study are compared with those subjects studied by McKay for whom the intakes were comparable. The results of the pre-reduction period are compared to data obtained by McKay in which normal college-age women were eating self-selected diets. These data establish the ability of these obese subjects to retain nitrogen, calcium, and phosphorus in normal amounts before reduction.

The retentions of the reduction period are compared to those obtained by McKay in which not only the intakes of nitrogen and minerals of the subjects were comparable but the basic diets were identical. Here it may be seen that the number of

TABLE 1

Nitrogen retentions

	SUBJECT 1	SUBJECT 2		SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7	SUBJECT 8	AVERAGE
		a†	b‡							
	gm./day	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	
Period I: Pre-reduction, self-selected diet										
Total intake						11.43	14.32*	11.77	13.33	12.18
Total output						8.96	9.04	11.07	10.49	
Retention						2.47	5.28*	0.70	2.84	2.00
Period II: Low-caloric reduction diet										
Total intake	11.18	10.99	10.56	10.95	10.78	10.83	10.87	10.75	10.80	10.87
Total output	10.40	9.32	11.97	11.80	9.32	11.29	9.54	11.26	10.54	
Retention	0.78	1.67	−1.41	−0.85	1.46	−0.46	1.33	−0.51	0.26	0.27
Period III: Post-reduction controlled diet for the maintenance of weight										
Total intake				15.90	14.97	16.39	16.85	15.52	10.37*	15.93
Total output				15.84	15.91	15.41	15.48	16.78	8.91	
Retention				0.06	−0.94	0.98	1.37	−1.26	1.37*	0.04

* Values omitted from average of this period because diet atypical of the group.

† Test *a* made from the 36th day of the period.

‡ Test *b* made from 110th day of the period.

TABLE 2

Calcium retentions

	SUBJECT 1	SUBJECT 2		SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7	SUBJECT 8	AVERAGE
		a†	b‡							
	gm./day	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*
Period I: Pre-reduction, self-selected diet										
Total intake						1.230	1.830*	1.293	1.235	1.253
Total output						0.942	1.781	1.231	1.060	
Retention						0.288	0.049*	0.062	0.175	0.141
Period II: Low-caloric reduction diet										
Total intake	0.923	0.964	0.957	1.241	1.087	1.223	1.176	1.081	1.077	1.096
Total output	0.866	0.599	0.770	1.080	1.069	1.070	1.263	1.089	1.013	
Retention	0.057	0.365	0.187	0.161	0.018	0.153	−0.087	−0.008	0.064	0.079
Period III: Post-reduction controlled diet for the maintenance of weight										
Total intake				1.225	1.051	1.208	1.264	1.339	1.026*	1.217
Total output				1.365	1.131	1.175	1.214	1.345	0.758	
Retention				−0.140	−0.080	0.033	0.050	−0.006	0.268*	−0.029

* Values omitted from average of this period because of atypical diet.

† Test *a* made from the 36th day of the period.

‡ Test *b* made from the 110th day of the period.

subjects showing positive retentions of nitrogen, calcium, and phosphorus and the amounts retained were not as great during reduction (present study) as during weight maintenance (McKay study). The retention of calcium was influenced the least by the reduction routine.

Although the same basic diet was employed during the post-reduction period, results from McKay on

TABLE 3

Phosphorus retentions

	SUBJECT 1	SUBJECT 2		SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7	SUBJECT 8	AVERAGE
		a†	b‡							
	gm./day	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*	*gm./day*
Period I: Pre-reduction, self-selected diet										
Total intake						1.311	1.672*	1.369	1.337	1.339
Total output						1.041	1.956	1.344	1.179	
Retention						0.270	−0.284*	0.025	0.158	0.151
Period II: Low-caloric reduction diet										
Total intake	1.358	1.343	0.974	1.336	1.307	1.287	1.298	1.142	1.171	1.257
Total output	1.306	1.154	1.177	1.325	1.211	1.545	1.299	1.178	1.135	
Retention	0.052	0.179	−0.203	0.011	0.096	−0.258	−0.001	−0.036	0.036	−0.014
Period III: Post-reduction controlled diet for the maintenance of weight										
Total intake				1.659	1.547	1.557	1.802	1.575	1.002*	1.628
Total output				1.737	1.925	1.471	1.678	1.737	0.928	
Retention				−0.078	−0.378	0.086	0.124	−0.162	0.074*	−0.082

* Values omitted from average of this period because of atypical diet.

† Test *a* made from the 36th day of the period.

‡ Test *b* made from the 110th day of the period.

subjects with self-selected diets had to be used in order to find intakes comparable to those of this study. As may be seen in Period III of Table 4, the retentions in the post-reduction period are poorer than those observed by McKay *et al.* (14).

DISCUSSION

In the analysis of the data presented here, the results must be viewed conservatively since, with one exception, there was only one sampling period for each subject during each dietary period. However, validity is strengthened by the fact that the mean numerical value of the retentions as well as the number of subjects with a positive balance followed the same trend.

There are several possible explanations for the comparatively poorer retentions of the reduction period. The most obvious explanation is the competition for calories. It is possible that some protein was used for energy in preference to or coincident with the use of body fat, although it had been expected that the liberal allowance of carbohydrate would prevent this. However, the fact that retentions did not improve in the post-reduction period, when weight losses had ceased, would suggest that this was not the complete explanation. Furthermore, the only subject who was losing weight (Subject *6*) during the post-reduction sampling time was in positive balance with respect to all three nutrients, while the subjects who were in negative balance (Subjects *3*, *4*, *7*) were in weight equilibrium.

The calcium retentions for the three dietary periods also tend to disqualify the explanation based on competition for calories, since calcium also was retained better in the pre-reduction than reduction period and one would not expect the tissues in which calcium is concentrated to be used for calories. Combination of calcium with ketones and subsequent elimination does not explain the poorer calcium retention during reduction, since elimination of urinary ketones for all subjects was less than 100 mg. in 24 hr. in all periods.

Furthermore, the differences in intake do not seem to be the explanation since greater intakes of nitrogen and phosphorus did not improve retentions in the post-reduction period, and retentions were less satisfactory in all except the first period than in those of the subjects studied by McKay in which intakes were comparable.

Neither does the lack of dietary fat appear to offer a satisfactory explanation for the poorer retentions, since fat was increased from 37 gm. in the reduction period to 54 gm. in the post-reduction period without improvement in retention.

The absorption of the three nutrients was calculated by subtracting the amount of the nutrient found in the feces from the amount in the food intake. The mean coefficient of absorption of nitrogen was about the same in the three periods, but the calcium decreased from 30 per cent in the first period to 22 and 20 per cent in the second and third periods, respectively. Breiter *et al.*, (21) found 25 to 27 per cent for the mean calcium absorption of a group

TABLE 4

Comparison of nitrogen, calcium, and phosphorus retentions shown in present study and those reported by McKay (14)

CONSTITUENT OF DIET	MCKAY DIET	NUMBER OF SUBJECTS		MEAN INTAKE		AVERAGE RETENTION		SUBJECTS WITH POSITIVE MINERAL BALANCES	
		Present study	McKay (14)	Present study	McKay (14)	Present study	McKay (14)	Present study	McKay (14)
				gm.	*gm.*	*gm.*	*gm.*	%	%
Period I: Pre-reduction, self-selected diet									
Nitrogen	self-selected	3	29	12.180	12.020	2.000	1.230	100	90
Calcium	self-selected	3	4	1.253	1.261	.141	.125	100	100
Phosphorus	self-selected	3	7	1.339	1.351	.151	.175	100	100
Period II: Low-caloric reduction diet									
Nitrogen	controlled	8	13	10.870	10.870	0.270	0.740	62	85
Calcium	controlled	8	13	1.096	1.223	0.079	0.098	75	100
Phosphorus	controlled	8	15	1.257	1.245	−0.014	0.038	50	60
Period III: Post-reduction controlled diet for the maintenance of weight									
Nitrogen	self-selected	5	6	15.930	15.460	0.040	2.740	60	100
Calcium	self-selected	5	40	1.217	1.141	−0.029	0.104	40	100
Phosphorus	self-selected	5	14	1.628	1.627	−0.082	0.217	40	100

of young adults. The coefficient of absorption for phosphorus also fell from 67 to 56 and 57 per cent, respectively. Since the decreases in the coefficients of absorption varied, the amounts and the ratio of the nutrients absorbed were changed.

Examination of the data in the light of the proportions of calcium, nitrogen, and phosphorus in the adult body (13) shows that the amount of phosphorus absorbed in all periods and in every case was greater than that theoretically required for combination with the nitrogen and calcium absorbed. On the other hand, comparison of the amount of phosphorus absorbed to the amount theoretically required on the basis of the composition of the growing infant's body shows that only in the pre-reduction period (the only period in which the retentions compared favorably to those of normal subjects) was phosphorus absorbed in sufficient amounts to combine with the nitrogen and calcium absorbed. Furthermore, analysis of the records of individual subjects shows that during reduction and post-reduction the phosphorus absorbed was more than 5 per cent less than the amount theoretically needed in six balance periods, three in the reduction and two in the post-reduction periods. There were retentions of all three nutrients in only one out of these five periods studied. There were retentions of all three nutrients in 64 per cent of the 14 periods in which the phosphorus absorption was theoretically sufficient to combine with the absorbed nitrogen and calcium.

Since the capacity of the gastrointestinal tract to absorb calcium and phosphorus during Periods II and III would appear to be at least one of the limiting factors in the utilization of the three nutrients studied, the diets were studied in terms of servings of food groups. The food additions in Period III consisted of 5 servings of meat, 10 eggs, 2½ slices of wheat bread, and 4 servings of fruit or vegetable per period of 5 days. Since nitrogen absorption tended to parallel the increased intake, there is no reason to assume that the meat and eggs were not well digested. Nor would there be reason to assume interference with calcium and phosphorus absorption as a result of increased meat and eggs. On the other hand, increased intake of vegetable and cereal food with the consequent increase in cellulose and phytin phosphorus in Period III might account for the failure of the increased phosphorus ingested to be absorbed and for the relatively poorer absorption of calcium. The increase in vegetable of Period II over Period I is shown in Table 5. This might account in part for the poorer absorption and retentions of Period II. In any case, attention is drawn to the fact that unlimited allowances of vegetable food in

TABLE 5

Average number of servings of fruit or vegetable during five days

	SUBJECT 1	SUBJECT 2	SUBJECT 3	SUBJECT 4	SUBJECT 5	SUBJECT 6	SUBJECT 7	SUBJECT 8
Period I: Pre-reduction, self-selected diet	20	22	23	25	27	27	30	23
Period II: Low-caloric reduction diet	28	28	36	36	36	36	36	36
Period III: Post-Reduction controlled diet for the maintenance of weight			40	40	40	40	40	40

low caloric routines may not be advisable for optimal mineral retentions.

Although the subjects of this study were essentially in nitrogen, calcium, and phosphorus equilibrium, the retentions expected for the age group were not attained. The occurrence of such a condition for a brief period would not be a serious matter, but the findings reported in the preceding study indicate that in many cases a relatively low-caloric diet must be used for years by the obese or formerly obese young women. This would lead one to feel concern over the future of these women. Will the retentions result in limitation of growth and reduction of stores to be drawn upon during pregnancy and other periods of physical strain? An affirmative answer is indicated, but more extensive work is needed to confirm it.

SUMMARY

The effect of weight reduction on nitrogen, calcium, and phosphorus requirements of college-age women was studied by analyses of intake and excretion of eight subjects. A period of a self-selected diet preceded the reduction period and a period of an increased controlled diet for the maintenance of weight followed it. The reduction diet was calculated to provide all of the nutritive requirements, except calories, for this age group. Nitrogen, calcium, and phosphorus retentions were studied from seven-day samples of each dietary period.

The subjects' ability to retain nitrogen, calcium, and phosphorus in a manner comparable to that of normal young women of their age group was established by comparison of their retentions before reduction to those reported in the literature. The mean retentions of all three nutrients during the reduction period were poorer than those of the same subjects during the pre-reduction period of self-selected diet. The retentions also were poorer than those reported in the literature for subjects eating a controlled basal diet identical to the reduction diet of this study.

The addition of meat, eggs, vegetables or fruit, and whole wheat bread to the reduction diet did not increase the retention of the nutrients studied, although these additions provided large increases in intake of nitrogen and phosphorus.

The possible causes for the lower retentions of nitrogen, calcium, and phosphorus during and following weight reduction are discussed.

REFERENCES

(1) NEWBURGH, L. H.: Obesity. Arch. Int. Med. 70: 1033, 1942.

(2) EVANS, F. A., AND STRANG, J. M.: The treatment of obesity with low caloric diets. J. A. M. A. 97: 1063, 1931.

(3) KEETON, R. W., AND DICKSON, D.: Excretion of nitrogen by obese patients on diets low in calories, containing varying amounts of protein. Arch. Int. Med. 51: 890, 1933.

(4) STRANG, J. M., MCCLUGAGE, H. B., AND EVANS, F. A.: Nitrogen balance during dietary correction of obesity. Am. J. Med. Sci. 181: 336, 1931.

(5) JANSEN, W. H.: Untersuchungen uber stickstoffbilanz bei kalorienarmen ernahrung. Deutches Arch. f. Klin. Med. 124: 1, 1917.

(6) OHLSON, M. A., AND DAUM, K.: A study of the iron metabolism of normal women. J. Nutrition 9: 75, 1935.

(7) MORGAN, H.: The laxative effect of a regenerated cellulose in the diet: Its influence on mineral retention. J. A. M. A. 102: 995, 1934.

(8) SMITH, F. H.: The use of high-fat diets for constipation. J. A. M. A. 88: 628, 1927.

(9) BOYD, O. F., CRUM, C. L., AND LYMAN, J. F.: The absorption of calcium soaps and the relation of dietary fat to calcium utilization in the white rat. J. Biol. Chem. 95: 29, 1932.

(10) STEARNS, G.: The significance of the retention ratio of calcium: Phosphorus in infants and children. Am. J. Dis. Child. 42: 749, 1931.

(11) STEARNS, G.: Soy bean flour in infant feeding. Am. J. Dis. Child. 46: 7, 1933.

(12) HAWKS, J. E., BRAY, M. M., WILDE, M. O., DYE, M., *et al.*: Interrelationship of calcium, phosphorus, and nitrogen in the metabolism of pre-school children. J. Nutrition 24: 283, 1942.

(13) MITCHELL, H. H., HAMILTON, T. S., STEGGERDA, F. R., AND BEAN, H. W.: Chemical composition of the adult human body and its bearing on the biochemistry of growth. J. Biol. Chem. 158: 625, 1945.

(14) MCKAY, H., PATTON, M. B., OHLSON, M. A., PITTMAN, M. S., LEVERTON, R. M., MARSH, A. G., STEARNS, G., AND COX, G.: Calcium, phosphorus and nitrogen metabolism of young college women. J. Nutrition 24: 367, 1942.

(15) MCKAY, H., PATTON, M. B., COX, G., OHLSON, M. A., PITTMAN, M. S., LEVERTON, R. M., MARSH, A. G., AND STEARNS, G.: Length of the observation period as a factor in variability in calcium retentions. J. Home Econ. 34: 679, 1942.

(16) Food and Nutrition Board, National Research Council: Recommended allowances for the various dietary essentials. J. Am. Diet. A. 17: 565, 1941.

(17) SHERMAN, H. C., AND LANFORD, C. S.: The Essentials of Nutrition. 2nd ed. New York: Macmillan Co., 1941.

(18) STEARNS, G.: A rapid method for the preparation of fecal digests suitable for use in nitrogen and mineral analyses. J. Lab. & Clin. Med. 14: 954, 1929.

(19) FISKE, C. H., AND SUBBAROW, Y.: The colorimetric determination of phosphorus. J. Biol. Chem. 66: 375, 1925.

(20) PETERS, J. P., AND VAN SLYKE, D. D.: Quantitative Clinical Chemistry. Vol. II, Methods. Baltimore: The Williams and Wilkins Co., 1931.

(21) BREITER, H., MILLS, R., RUTHERFORD, E., ARMSTRONG, W., AND OUTHOUSE, J.: The utilization of the calcium of carrots by adults. J. Nutrition 23: 1, 1942.

Water as a Soluble for Vitamin A

Drs. Albert E. Sobel, Sidney P. Gottfried, and Benjamin Kramer, Jewish Hospital, Brooklyn, reported before the American Chemical Society in September on experiments which indicate that a new water solution for vitamin A increases the utilization of the vitamin in the human body, particularly in children whose absorption of the vitamin when administered in an oil solution had been poor. By this new method, the level of vitamin A in the blood was raised to eight time the level when oil solution was used.

Sodium Restriction as a Dietary Measure in Hypertension[1]

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THE SODIUM ion constitutes an important element in the animal body. It is the inorganic element present in highest concentration in the body fluids, and by its osmotic effect maintains the proper balance between the volume of the intracellular and extracellular fluids. In the normal individual the amount of sodium present in the body is maintained at an optimal level by the balance between the sodium ingested and that lost in the sweat and excreta. However, in conditions of disease there may be an abnormal accumulation of sodium due usually to renal deficiency or cardiac failure. Under these conditions edema results from an accumulation of water and the inorganic constituents of the body (particularly sodium chloride). This accumulation of fluid in the extracellular compartments and in the blood has long been treated along with other measures by limiting the salt intake, and thus permitting the body to rid itself of the excess salt and its accompanying water.

Recently, the use of a drastically sodium restricted diet has also been advocated in the treatment of hypertension. Although the mechanism of action of this procedure is not entirely elucidated, it would appear that it serves as a means of reducing the volume of the extracellular fluid which, in turn, diminishes the plethora of the vascular system and results in a lowering of the blood pressure. In any case, there is at times a gratifying reduction in the blood pressure.

The use of a low salt diet in the therapeutic management of patients with hypertension was first advocated at the beginning of the century by Ambard in France and later in this country by Allen and Sherrill. Despite the apparent beneficial effects, the method did not receive general acceptance because of the lack of any experimental evidence upon which the rationale of the procedure could be based and also because of the failure to differentiate between the importance of the chloride and sodium ions. The sodium ion is now recognized as preeminent in importance, and it is only a limitation of this ion which results in the desired effects. It is now recognized also that to be effective, the procedure must be drastic with the reduction in the sodium intake to 0.5 gm. or less daily.

Moderate restriction of sodium fails to influence the blood pressure, nor does the addition of extra salt to the ordinary diet raise the blood pressure. These observations cast doubt upon the possible benefits to be derived from rigid salt restriction and militated against the acceptance of the procedure as being worth while. However, with the recent interest in the study of the mechanism and pathogenesis of hypertension, it has become clear that this disease results from renal disturbance. It is possible, moreover, to produce a condition resembling that observed in the human in the experimental animal. In this way the effects of various procedures can be studied and conclusions drawn which are not deducible from studies on the human patient. By this procedure it has been shown that in rats, sodium restriction results in a marked decrease in blood pressure. Application of the same procedure to the human brought results indicating its value in the treatment of hypertension.

The results vary, depending upon the nature of the underlying disorder and the duration of the disease, for secondary changes in the vascular system inevitably occur in long-standing hypertension which will modify the effect of a given procedure. It has been our observation that in the young plethoric individual gratifying reductions in blood pressure can be induced. In the older individual in whom marked changes in the vascular system have occurred, the changes are less impressive and in fact insofar as the blood pressure is concerned are often imperceptible. Nevertheless, it would appear clinically that the procedure is worthy of application even in the latter

[1] Presented before the Texas Dietetic Association, May 10, 1946. Received for publication June 17, 1946.

TABLE 1

Typical menus containing less than 0.5 gm. of sodium for a week (1)*

MORNING		NOON		EVENING	
		Monday			
	gm.		*gm.*		*gm.*
Orange juice	50	Meat patties	50	Chicken	50
Grapefruit juice	200	Macaroni	125	Peaches	50
1 egg + 1 egg yolk		Tomatoes	75	Grapes	100
Oatmeal	90	Lettuce	25	Apricots	200
Dialyzed milk		Apple	100	Lemon juice	50
Sugar	35	Grape juice	100	Sugar	25
Coffee	as desired	Butter, unsalted	10	Butter, unsalted	10
		Tuesday			
Grape juice	200	Lamb	50	Beef patties	50
1 egg + 1 egg yolk		Rice	125	Potatoes	125
Farina	90	Tomatoes	75	Squash	100
Dialyzed milk		Lettuce	25	Butter, unsalted	10
Sugar	35	Butter, unsalted	10	Apples	100
Coffee	as desired	Peaches	100	Lemon juice	50
		Orange juice	200	Sugar	25
		Wednesday			
Grapefruit juice	200	Butter, unsalted	12	Lean steak	50
1 egg + 1 egg yolk		Beef	60	Squash	100
Rice	120	Eggplant	100	Grapefruit juice	66
Dialyzed milk		Macaroni	120	Apples	100
Sugar	38	Apricots	100	Lemon juice	50
Coffee	as desired	Grape juice	100	Sugar	39
		Sugar	20	Butter, unsalted	12
		Thursday			
Orange juice	100	Meat	65	Meat	50
Peaches	200	Macaroni	120	Rice	120
Oatmeal	120	Tomatoes	100	Eggplant	100
1 egg + 1 egg yolk		Grape juice	200	Squash	100
Dialyzed milk		Sugar	12	Grapefruit juice	200
Sugar	35	Butter, unsalted	12	Sugar	24
				Butter, unsalted	12
		Friday			
Apple juice	200	Fish	75	Meat	50
1 egg + 1 egg yolk		Potatoes	100	Eggplant	100
Dialyzed milk		Tomatoes	75	Rice	120
Sugar	32	Lettuce	25	Butter, unsalted	12
Farina	120	Grapefruit juice	200	Sugar	39
Coffee	as desired	Butter, unsalted	12	Peaches	200
		Sugar	36		
		Saturday			
Grape juice	200	Meat	50	Meat	50
1 egg + 1 egg yolk		Potatoes	100	Rice	120
Sugar	23	String beans	100	Cabbage	100
Cereal (oatmeal)	120	Cabbage	100	Tomatoes	75
Dialyzed milk		Sugar	33	Lettuce	25
		Butter, unsalted	12	Butter, unsalted	12
		Apples	100	Sugar	27
				Lemon juice	50
				Grapefruit juice	200

* 1400 cc. of dialyzed milk was administered daily.

subjects, because symptomatic improvement may be noted and the use of sedatives avoided.

The usual, so-called salt-free diet used in the treatment of congestive heart failure will contain about 3 gm. of sodium chloride per day. This is far in excess of the allowable amount if one is to obtain results in the treatment of hypertension. For this reason, diets drastically restricted in sodium content had to be devised. The great difficulty in obtaining such diets is the fact that the essential protein requirement of the individual necessarily entails the use of such materials as milk which are relatively high in sodium content. Since milk constitutes a good source of animal protein, its sodium was removed by dialysis[2] and in this way a sodium-free product which could be added to the diet was obtainable. In our more recent work we have used a specially prepared powdered milk product in which the sodium content is negligible.

TABLE 2

Estimation of sodium and chlorine in one day's menu

FOOD	WEIGHT OF FOOD	Na*	Cl*
	gm.	*gm.*	*gm.*
Morning			
Grapefruit juice	200	0.010	0.004
1 egg	50	0.070	0.060
1 egg yolk	15	0.009	0.021
Rice, cooked	120	0.007	0.002
Sugar	38	0.000	0.000
Coffee as desired		0.000	0.000
Dialyzed milk**	1400		
Noon			
Beef, cooked	60	0.063	0.057
Eggplant	100	0.015	0.047
Macaroni, cooked	120	0.005	0.013
Apricots	100	0.030	0.002
Grape juice	200	0.001	0.002
Sugar	20	0.000	0.000
Butter, unsalted†	12	0.001	0.001
Evening			
Lean steak, cooked	50	0.060	0.055
Squash	100	0.004	‡
Grapefruit juice	66	0.003	0.001
Apple	100	0.010	0.004
Lemon juice	50	0.007	0.002
Sugar	24	0.000	0.000
Butter, unsalted†	12	0.001	0.001
Total		0.295	0.272

* Sherman, H. C.: Chemistry of Food and Nutrition. 7th Ed. New York: The Macmillan Company, 1946.

** Analyses reveal the presence of less than 0.001 gm. of sodium in dialyzed milk.

† Butter may be freed of its sodium content by washing it thoroughly with water. The soft butter may be kneaded repeatedly in water to remove its contained salt.

‡ Doubtless present but quantitative data have not been found.

In Table 1 are given sample menus for six days which contain less than 0.5 gm. of sodium per day and which was found suitable for inducing the desired effects. An estimation of the sodium and chlorine content of one of these menus is presented in Table 2. Reference to analytical data on food reveal that vegetables and plant products in general are relatively low in sodium content. These may be used liberally in preparing a low-sodium diet. On the other hand, the following list of commonly used substances are high in sodium content and hence must be avoided:

All salted foods
Bacon
Ham
Pretzels
Beer
Milk
Salted butter
Preserved meats
Salted nuts
Excessive amount of salted bread
Olives
Pickles
Bicarbonate of soda
Phosphate of soda
Avocado
Barley
Beans—Lima
Beets
Celery
Chard
Cheese
Dandelion
Buckwheat
Kidney
Onions
Oysters
Haddock
Graham crackers
Canned soups
Canned vegetables
Sea food, all kinds
Dry cereals unless specially processed
Salad dressings
Relishes

Any diet drastically restricted in sodium immediately brings up the problem of the possible deleterious effects which may result from sodium and chloride deficiency. As is well known, a deficiency of sodium chloride such as is induced, for example, by the excessive loss of this compound in the sweat produces a very characteristic syndrome marked by weakness, excessive fatigability, impaired mental acuity, anorexia, and nausea. Hence patients who are subjected to such diets must be watched closely, particularly in hot weather for symptoms of salt deprivation. Moreover, in patients in whom there is renal insufficiency with an increase in the nonprotein nitrogen of the blood, sodium restriction will prove harmful and must be avoided.

The insipid taste of salt-free food can be easily overcome by the use of salt substitutes. The sodium salts of organic acids which have been marketed for this purpose obviously defeat the purpose of sodium restriction and should not be used. However, a mixture of potassium chloride, potassium citrate, and ammonium chloride forms an effective substitute which, with other sodium-free condiments such as lemon juice, paprika, garlic, and so forth, overcomes any difficulty in this regard.

[2] See page 928 for a description of dialysis.

REFERENCE

(1) GROLLMAN, A., HARRISON, T. R., MASON, M. F., BAXTER, J., CRAMPTON, J., AND REICHSMAN, F.: Sodium restriction in the diet for hypertension. J. A. M. A. 129: 533, 1945.

Prewar Nutrition in Rural China[1]

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THE Chinese diet is essentially a cereal diet. China is a large country and food materials and food habits vary greatly. However, a sufficient number of dietary studies have been carried out during the last 20 years to indicate that the diagram in Figure 1 constitutes a fairly correct picture of the average rural dietary intake. A comparative diagram showing the food intake for the United States is also included in this figure. While there are some differences between the food habits of rural China and those of the cities, urban China accounts for only 10 per cent of the entire population.

A VEGETARIAN DIET

In the southern two thirds of China the cereal is rice. In the northern third, no one cereal takes the place of rice, but wheat is the most important. Millet, barley, and corn are also used. In Table 1, figures show the relative importance of each cereal. These figures, it should be noted, are prewar figures. Soybean has been included with the cereals merely for convenience. In China the intake of soybeans is small compared to the total cereal-legume intake. The rice diet and the wheat diet in each area are, of course, reflections of agricultural conditions.

The virtual absence of milk and the extremely small intake of meat and eggs mean that the Chinese diet is fundamentally a vegetarian diet. Many Chinese have never tasted cow's milk, and many of the rural people consume no meat at all beyond a few bits of pork in the manner of a special indulgence to celebrate the Lunar New Year. China, with its 400 million people, presents, therefore, probably the best example of a large-scale vegetarian diet in actual operation—certainly insofar as the rural people are concerned. China represents an unusual field of study for the student of nutrition and food habits.

One research laboratory in China has conducted thorough studies using rats to determine the comparative merits of the vegetarian and omnivorous diets. These experiments can be summarized simply by stating that after studying various types of criteria, including growth and reproductive performance, the workers in this laboratory did not succeed in finding any combination of food materials of purely vegetarian origin in which the nutritive value equalled that of a good omnivorous diet. There are many phases of this situation that can still be profitably investigated and one should not be limited to laboratory rats as test animals.

Vegetarian peoples are usually vegetarian in their food habits not because of some dietetic whim or fancy. There is usually an economic reason. Most of China's peasantry, if given the choice, would prefer meat. The peasant farmer knows that the conversion of cereal first into beef, or via the cow into milk, *i.e.* into animal foods, is a less efficient process than consuming the cereal directly as human food. He may not be able to express this scientifically, but at least he senses the fact that producing beef and milk is a more expensive process than producing cereals. Our own agricultural economists figure that converting vegetarian food (cereal) into animal food (meat) involves conversion losses of 80 to 90 per cent. The rural Chinese can ill afford this loss and as a result the diet is vegetarian, not by choice, but by necessity.

In the agricultural areas of China, the economic factor asserts itself in still another form, that is, in the form of population pressure. China is largely agricultural in its economy. Industrialization has just begun. Transportation facilities are poorly developed. The population depends directly on the farm for food. The economist is not surprised, therefore, to discover a relationship between population and land area, or between population and the food produced per unit of land area. An equilibrium has been reached and this equilibrium in many areas is so delicately balanced that any disturbance of the agricultural *status quo* is immediately reflected either in a change in the number of population or in their nutritional welfare.

The nutritive components of the average Chinese diet are shown in Table 2. It is evident that the diet

[1] Presented at the Chemical Institute of Canada, Montreal, February 21, 1945. Received for publication June 20, 1946.

is carbohydrate-rich. The daily caloric intake of 2500 calories is probably sufficient, but not excessive. It allows no margin of safety. Approximately the same figure for calories is obtained whether the actual food intake is measured by means of dietary studies or whether the total crop production is figured as intake and then calculated into per capita units.

TABLE 1

Production of cereal crops in China (1)

CEREAL CROP	PERCENTAGE OF TOTAL CROP AREA OCCUPIED
Rice	28.3
Wheat	16.3
Millet	9.4
Soybeans	5.4
Kaoliang	4.7
Barley	4.4
Maize	3.7
Other legumes	3.7
Rapeseed	1.7
Peanut	1.2

TABLE 2

Nutritive constituents in average rural Chinese diet

NUTRIENTS	AVERAGE AMOUNTS IN RURAL CHINESE DIET
Calories	2500
Protein	80 gm.
Fat	30 gm.
Carbohydrate	480 gm.
Calcium	0.45 gm.
Phosphorus	1.2 gm.
Iron	20 mg.

The amount of protein shown for the average Chinese diet (Table 2) would appear to be sufficient. The sources of this protein are shown in Table 3. It must be noted that approximately 95 per cent of this protein is vegetable protein, which is of somewhat lower biological value than animal protein. Our experience indicates that its digestibility is also generally less, occasionally a slow as 55 to 60 per cent, whereas protein digestibilities for ordinary mixed diets may range from 80 to 90 per cent. These factors cannot be overlooked.

The peasant farmer of North China, it would appear, has attempted to overcome whatever handicap is represented by his dependence on a cereal vegetarian protein by adopting a mixed cereal protein rather than a single cereal protein as the staple item of diet. The millet-corn-soybean mush of North China, which is the northern farmer's principal food, is found to contain protein of superior supplementary value. Incidentally, this is only one of many examples which hint that the Chinese farmer, led by blind experiment, has made discoveries in the field of nutrition.

The calcium intake (Table 2) is admittedly low. Most of the child feeding programs in China have been concerned with attempts to increase the calcium intake. The usual sources and amount of calcium in the Chinese dietary are outlined in Table 4.

No reliable data are yet available on the vitamin content of the average dietary. Vitamin deficiencies

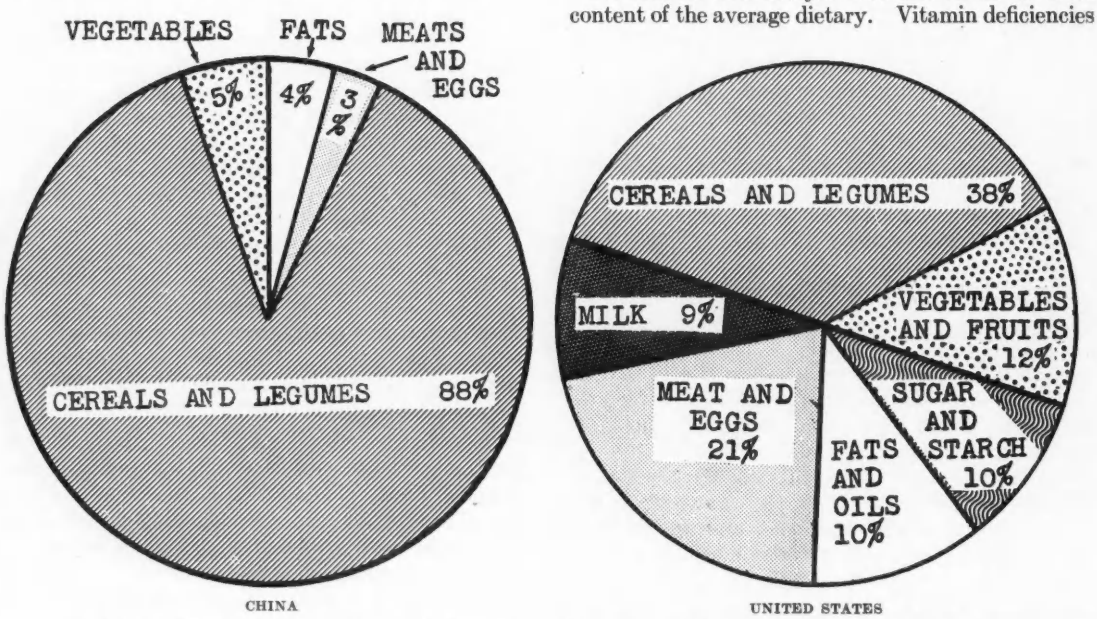

FIG. 1. *Comparison of food consumption in China and the United States in percentage of caloric intake*

are marked by the occurrence of beriberi in the Southeast and by the occurrence of avitaminosis-A in the North. Riboflavin and niacin deficiencies have been reported from refugee camps in the Shanghai area.

TABLE 3

*Comparison of sources and amounts of protein in the average rural Chinese diet with diet in the U. S.**

FOODS	AVERAGE AMOUNT OF PROTEIN IN RURAL CHINESE DIET	AVERAGE AMOUNT OF PROTEIN IN U. S. DIET
	gm.	*gm.*
Cereal and legumes	71	29
Vegetables and fruits	4	5
Meat and eggs	5	31
Milk	0	18
Total	80	83

* In gm. per capita per day.

TABLE 4

*Comparison of sources and amounts of calcium in the rural Chinese diet with diet in the U. S.**

FOOD	AVERAGE AMOUNTS OF CALCIUM IN RURAL CHINESE DIET	AVERAGE AMOUNTS OF CALCIUM IN U. S. DIET
	gm.	*gm.*
Cereals and legumes	.36	.15
Vegetables and fruits	.08	.10
Meat and eggs	.01	.15
Milk	.00	.48
Total	.45	.88

* In gm. per capita per day.

TABLE 5

Nutritional requirement for an adult in China and suggested diet (2)

	WEIGHT OF FOOD	CALORIES	PROTEIN	CALCIUM
	gm.		*gm.*	*gm.*
MINIMUM REQUIREMENT		2400	80	1.00
SUGGESTED DIET				
Protective foods				
Green leafy vegetables	500	75	6	0.50
Soybean products	60	264	24	0.06
Tubers (sweet potato)	400	284	5	
Supplementary foods				
Cereals	500	1765	43	0.47
Total		2388	78	1.03

NUTRITIONAL REQUIREMENT FOR CHINA

A proper evaluation of the nutritive value of the Chinese diet must wait further measurement of the nutritive value of Chinese foods as well as more studies on food habits and intake. A first step in improving the dietary regime was taken when the Chinese Medical Association issued its report on the "Minimum Nutritional Requirement for China" in 1938. These recommendations are shown in Table 5. No quantitative recommendations were included in this report respecting the vitamin intake.

There has been some criticism of these standards. Some have felt that the caloric requirement is too high. Others suggest that these are merely Occidental standards recalculated to fit the lighter average body weight of the Chinese.

As an ultimate goal in the improvement of the nutritional status of the Chinese people, nutritionists hope for an adequate milk supply and larger supplies of eggs and meat. It is probable, however, that this ideal cannot be attained in the immediate future, at least for large numbers of the population. As a more practical measure, it has been suggested that cereals should be replaced by more leafy vegetables, and this, it is thought, can be carried out within the limits of the present agricultural economy.

To study the possibilities of such a dietary rearrangement, preliminary feeding experiments on laboratory rats and with human subjects were under way at the outbreak of the Pacific war. During this period, some of the data were lost. The results in general, however, indicated that laboratory rats on a cereal diet showed distinct improvements in growth when leafy vegetables, either fresh or dehydrated, were used to replace some of the cereal. The maximum improvement was obtained when the diet consisted of 15 per cent leafy vegetable (calculated to a dry basis) and 85 per cent of cereal. This type of diet also provided distinct increases in the calcium intake, an improvement in the skeletal development generally, with possibly some improvement also in the quality of the protein. Studies on the amino acid content of vegetable food materials have suggested that it is not impossible to supply the essential amino acids from purely vegetarian sources. However, under the limitations of this vegetarian dietary, it seems feasible to recommend only rather simple readjustments. Vitamins must also receive major attention. China's problem is the problem of producing a more balanced dietary within the limits set by her agricultural economy.

REFERENCES

(1) BUCK, J. L.: Land Utilization in China. Shanghai: Commercial Press, 1937.

(2) COMMITTEE ON NUTRITION, THE COUNCIL ON PUBLIC HEALTH, CHINESE MEDICAL ASSOCIATION. Minimum nutritional requirement for China. Chinese Med. J. 55: 301, 1939.

Sanitation for Food Departments[1]

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THE NEED for proper food sanitation is recognized by everyone. The layman knows that food can cause sickness. He may incorrectly call it "ptomaine poisoning," but nevertheless he is aware that food can cause disease.

The importance of food sanitation is vividly depicted in the statistics presented by the U. S. Public Health Service (1). It is reported that in 1943 there were 285 epidemics due to disease transmission by food and food handling. There were 13,938 cases of illness and 33 deaths. These figures represent only reported epidemics. Undoubtedly there were thousands of cases of illness which were not reported.

In the epidemics reported for 1943 by the U. S. Public Health Service, the following causes of illness were enumerated: dysentery, chemical and food poisoning, gastroenteritis, typhoid fever, paratyphoid fever, scarlet fever, trichinosis, and botulism. The following foods were incriminated as carriers of the diseases reported in these epidemics: home canned mushrooms, tomatoes, peas, pumpkin, string beans, fish, ham, stew, soup, meat and egg salad sandwiches, chicken and dressing, raw oysters, souse, baked beans, cream puffs, cream pastry, creamed potatoes, chocolate eclairs, tapioca pudding, eggs, custard, potato salad, pie, shrimp salad, turkey dressing, and sausage. Such a listing of diseases and foods emphasizes the need for precautions in the sanitary handling of foods.

The U. S. Public Health Service list, of course, does not cite the many cases of trench mouth, septic sore throat, common colds, and other diseases transmitted by mouth and nose secretions which were undoubtedly spread by improperly washed and sanitized dishes. None of these diseases were reported to health authorities because they represent isolated cases, not epidemics. Furthermore, the source of infection was unknown. The actual number of cases each year due to food mishandling cannot be determined.

A typical picture of an outbreak of food poisoning has been reported in *New York Health News* (2). An epidemic due to a staphylococcus toxin was caused by the consumption of contaminated ham. There were 17 known cases all of whom gave a history of having eaten plain ham sandwiches or combination ham and cheese sandwiches at a soda fountain. Illness occurred from 45 min. to 11 hr. after consumption of the sandwiches and lasted from two to three days.

> Investigation disclosed that suspected ham was of the precooked variety and was delivered at the store three days before being served to the patrons. Soon after, it had been brought to the home of the proprietor where it was refrigerated for 24 hours, then boiled for 1½ hours. It was allowed to cool at room temperature and then placed in the refrigerator until it was brought to the store .... Sandwiches were prepared at a counter remote from the soda fountain, wrapped in waxed paper, and brought to the fountain for serving .... Refrigeration facilities at the establishment included a display case but no temperature recordings were available. On laboratory examination, portions of the ham were found to be contaminated with *Staphylococcus aureus*. The remainder of the meat was destroyed.

It is not within the province of this paper to present a discussion of diseases transmissible by foods, but the above comments are presented to show the need for sanitation in the food establishment and for yardsticks to measure sanitation. In many instances we have no dependable yardsticks or we have no standards at all. This paper will be devoted largely to the research in progress.

For the past decade the writer has devoted considerable time and effort to the evaluation of various means of measuring sanitation in food establishments for the use of the sanitarians and operators. At the present our laboratories are conducting an extensive study on mechanical dishwashing sponsored by the National Sanitation Foundation.

To evaluate washing and sanitizing procedures under practical conditions five sets of single tank, hand-operated machines have been installed. Five of the leading dishwashing machine manufacturers have loaned these machines. Two machines of each manufacturer are attached together by an apron so that one machine can be used exclusively for washing

[1] Presented at the New England Conference on Organization and Management, June 7, 1946.

and the other for rinsing. In this way conditions of temperature and concentration of detergents are controlled without interference from dilution by rinse waters. The machines are supplied with water of constant temperature and recording devices have been installed to measure temperature and flow pressures so that each experiment can be accurately checked and reproduced.

One of the first problems was the determination of the time and temperature of rinse necessary to render a dish free from health hazards.

The Ordinance and Code Regulating Eating and Drinking Establishments of the U. S. Public Health Service (3) states that where dishes are hand washed they shall be immersed "for at least 2 min. in clean hot water at a temperature of at least 170°F. or ½ min. in boiling water. . . . The pouring of scalding water over washed utensils shall not be accepted as satisfactory compliance."

In dishwashing machines, the Code states: "The use of higher wash water temperatures, higher detergent concentrations, and the more efficient mechanical removal of soil make it possible to employ a shorter exposure period for the final treatment."

The need of further research on time and temperature is recognized by the U. S. Public Health Service in the following statement: "Additional research on dishwashing machines will be required to establish definitely the necessary wash and rinse water temperatures, the minimum washing and rinsing times . . ., the optimum concentrations of different detergents, and similar factors. However, it seems to be fairly well established that the wash water temperatures should be approximately 140°F. . . . and no lower than 120°F. . . . that the rinse water temperatures should be at least 170°F."

To study time and temperature of rinse, it was necessary to develop a "soil" that would not be removed by rinsing. This "soil" was seeded with a test organism (*Micrococcus caseolyticus*) with a resistance to heat greater than that of most of the disease-producing bacteria which might be encountered on dishes. The soil was spread evenly over the surfaces of a dinner plate by an automatic "soiling" machine developed in our laboratories. The soiled plates were then placed in the machines and rinsed at various temperatures and time intervals. After rinsing, the soil was removed aseptically and the number of surviving bacteria determined. It has been found that at 170°F. 88 per cent of the bacteria are killed in 5 seconds in all the machines. In 10 seconds 97 per cent have been killed, and in 15 seconds 99 per cent. These results were obtained on plates placed in the center of the wash trays. At a temperature of 160°F. only 68 per cent of the bacteria were killed in 5 seconds, 82 per cent in 10 seconds, and 94 per cent in 15 seconds. It is quite apparent that in operating dishwashing machines, the temperature of 170°F. recommended by the U. S. Public Health Code for Eating and Drinking Establishments is correct. The Code does not specify the time interval for rinsing, but data would indicate that it should be at least 10 seconds in a single tank, hand-operated machine. These data must not be construed to apply to all machines. It is planned to study all types of machines but this has not yet been done. It is conceivable that shorter time intervals may be satisfactory in other types of machines, particularly if large volumes of water are used.

These data indicate definitely the need for maintaining rinse waters at temperatures of 170°F. or higher. As stated in a previous publication (4), a thermometer should be passed through the machine at intervals to make certain that proper rinse temperatures are being maintained.

A second phase of this study is concerned with washing procedures. Here a standard "soil" consisting of butter, lard, flour, egg powder, and milk was developed. This soil was placed evenly on dinner plates, dried, and the plates were washed in the machines at various temperatures and time intervals. It was found that with a mixed soil, the higher the temperature, the more effective the removal up to 170°F. However, when a straight egg soil was applied to the plates, temperatures above 140°F. caused the soil to stick to the plate and the higher the temperature above 140°F. the worse the sticking. Inasmuch as egg soil is common to all meals, wash water temperatures should be between 130° and 140°F.

Although there are many phases in which interesting and helpful information on dishwashing has been obtained, these results are purely preliminary findings. A full report of this phase of our studies will be published later.

The measurement of the degree of sanitation obtained by bacterial methods has been of major concern for a number of years. In 1935, Mallmann and Devereux (5) made a survey of restaurants to determine the bacterial populations of supposedly washed and sanitized dishes. The survey showed that few places had properly sanitized utensils. The workers reported only their findings on beverage glasses, but also found in data not reported that chinaware and silverware washed both by hand and by machine were also improperly washed and sanitized.

To determine the number of bacteria, a swab technique was devised. Briefly, this consisted of swabbing the rims of glasses on the inside and outside. The swabs were washed off with sterile saline and the saline plated quantitatively to determine the numbers present on the rim of the glass. Although numerous techniques have been proposed for measuring bacterial contamination, this technique has become an established procedure. A standard technique has been presented by the Committee on Restaurant Sanitation of the American Public

Health Association (6). This procedure has been incorporated into the Ordinance and Code Regulating Eating and Drinking Establishments of the U. S. Public Health Service (3). The Code states: "The average plate count per utensil surface examined should not exceed 100. Higher counts are presumptive evidence of inadequate cleaning and bactericidal treatment or recontamination by handling or during storage."

The swab procedure has become routine practice in many public health laboratories. When public health officials measure dish sanitization, if the bacterial counts remain under 100 over a period of time, the dishwashing is considered satisfactory and frequently no further investigations are made of dishwashing facilities and procedures. Unfortunately in many cases swab samples are taken routinely in food service establishments without regard to the manner or method of dishwashing and sanitization.

Recently a study was made of dishwashing in a single tank, hand-operated machine where some temperatures were purposely kept at 140°F. or below to obtain some knowledge of bacterial populations where mechanical removal would be the only means of reducing populations. The data are presented in Table 1. It may be observed that the bacterial count per unit was under 100 in two groups of tests when the wash temperature was 120°F. and the rinse 140°F. or under. Even with bacterial populations of 41,000 to 65,000 per ml. of wash water, the bacterial count averaged from 158 to 224 respectively when mechanical removal was used.

TABLE 1

Reduction of bacteria on dishes washed by mechanical removal for 120 seconds and rinsed for 10 seconds

TRIAL	TEMPERATURE OF WASH WATER	TEMPERATURE OF RINSE WATER	NUMBER OF PLATES SWABBED	AVERGAE NUMBER OF BACTERIA	BACTERIAL COUNT OF WASH WATER
	°F.	°F.			*per ml.*
1	120	120	16	88	37,000
2	120	140	16	89	50,000
3	120	130	8	158	41,000
4	120	140	20	160	45,000
5	120	130	20	224	65,000

To determine the influence of bacterial counts in wash water, a series of tests were made throughout the day on dishes cleaned by mechanical removal using only wash water. These tests were made in a single tank, hand-operated dishwashing machine where the rinse water flowed into the wash water. The data are presented in Table 2. With a bacterial count of 20,000 for the wash water the bacterial count per unit was 92. A gradual increase in counts occurred as the bacterial count of the wash water increased. However, with a count of 39,000 for wash water, the count was only 145 for dishes. After proper rinsing even with water of non-lethal temperatures, the bacterial counts of dishes were usually under 100. Such dishes would be considered satisfactory by the standard swab technique. Thus, if we were to depend upon bacterial counts obtained by this technique, we would accept dishes improperly sanitized. When such findings are reported to operators, they assume that low rinse temperatures are acceptable because the bacterial counts were satisfactory. When the sanitarian finds by checking rinse temperatures, that the temperature is below standard, he should notify the operator of the unsatisfactory condition and not take swabs. Swabbing dishes at times when washing is not in progress may give very unsatisfactory results.

In our community, counts obtained by the swab technique seldom are in excess of 100, yet a recent survey of dishwashing machines showed that no machine was operating at temperatures above 145°F. On the basis of swab tests all of the restaurants in this community were doing an acceptable job, yet all were violating the sanitation code which requires a rinse temperature of 170°F.

There are no data to show that dishes with bacterial counts under 100 per unit where mechanical removal is the sole means of sanitization are dangerous. However, the idea that reduction of bacteria by dilution is a safe procedure of sanitization is not accepted. Certainly it would be better policy to subject dishes to a temperature lethal for disease-producing bacteria irrespective of the total numbers present on the dish. Furthermore, the fact that mechanical removal has done a satisfactory job today is no assurance that the bacterial picture will be the same tomorrow. If dishes are subjected to 170°F. for 10 seconds irrespective of bacterial count on the washed dishes, we do have assurance that the dishes are free of health hazard.

TABLE 2

Reduction of bacteria on dishes washed by mechanical removal for 160 seconds

TRIAL	TEMPERATURE OF WASH WATER	NUMBER OF SWABS	AVERAGE NUMBER OF BACTERIA	BACTERIAL COUNT OF WASH WATER
	°F.			*per ml.*
1	120	4	92	20,000
2	120	4	95	24,000
3	120	4	97	29,000
4	120	4	110	33,000
5	120	4	120	35,000
6	120	4	145	39,000

These data show definitely that swab tests should only be used as a check on good dishwashing procedure. When temperatures of rinse water are found to be under 170°F. when checked by passing a thermometer through the machine, the operator

should be required to make adjustments so that proper temperatures are maintained. Swab tests should not be made because the operator is not maintaining proper sanitizing rinse water. Swab tests would frequently fail to show bacterial counts in excess of 100 and would thus give a false sanitary measurement.

Sanitary inspections of dishwashing should only be made at times when the machines are in operation. In fact sanitary inspections of food establishments should be made at meal times so that observations can be made under actual working conditions. Inspections at periods between meals may fail to reveal serious insanitary practices in washing dishes as well as many faults in food handling.

To assure good sanitary practice in food establishments, the operator must supervise each step in food handling and serving. Good sanitation starts with the selection of quality food, proper storage, proper cooking, sanitary cleaning and handling of food utensils, maintenance of good refrigeration, and proper sanitary handling in serving.

Perishable foods, uncooked and cooked, should be held at temperatures under 50°F. Cooked foods, such as custards and salads, should be refrigerated promptly after cooking to prevent bacterial multiplication. Foods should not be allowed to cool at room temperature before refrigeration. Many food epidemics have resulted from allowing food to stand at room temperature and thus allowing possible multiplication of food poisoning bacteria.

The whole program may utterly fail without properly trained personnel. A food establishment may have the best equipment and facilities and still be improperly operated. The first requisite in proper sanitary operation is an effective training program for all personnel. Not only should correct procedures be carefully taught, but the sanitary reasons for each step should be fully explained. If the workers are aware of the need for care in handling food and food equipment, they are more apt to exercise proper precautions. The training program should be done largely by demonstrations and visual aids. If the supervisors will work with workers in all departments from time to time, proper procedures will be maintained.

Once a correct routine is instituted, it is easy to maintain good sanitary practice. Supervisors should watch all steps in food preparation and handling constantly to avoid short-cuts and carelessness by the personnel.

REFERENCES

(1) Outbreaks of disease in the United States during 1943, transmitted by water, milk and milk products, and other foods. Public Health Reports 60: No. 18, 491, 1945.
(2) Contaminated ham suspected in gastroenteritis outbreaks: N. Y. Health News 23: 17 (Feb. 4), 1946.
(3) Ordinance and Code Regulating Eating and Drinking Establishments. Public Health Bull. 280, 1943.
(4) MALLMANN, W. L.: Sanitization of institution equipment. J. Am. Dietet. A. 21: 142, 1945.
(5) MALLMANN, W. L., AND DEVEREUX, E. D.: Sanitary survey of beverage establishments. Am. J. Public Health 25: 1007, 1935.
(6) A proposed method for control of food utensil sanitation. Am. J. Public Health 34: 255, 1944.

Choline and Vitamin Therapy for Cirrhosis of Liver

THE USE of choline, cystine, methionine, and vitamin supplements in chronic hepatic disease is based on two conceptions: first, that deficiencies in the intake of these substances will cause structural changes in the liver and render the organ more vulnerable to hepatotoxic substances; and second, that part of the clinical picture of hepatic insufficiency may be due to specific vitamin deficiencies secondary to failure of certain metabolic functions of the liver.

Numerous investigators have shown the clinical value of high-carbohydrate, high-protein diets with vitamin supplements in cases of cirrhosis. It is not entirely clear that the addition of choline to this program makes it a more efficient therapeutic instrument in late cirrhosis, but recent observations seem to indicate that choline, choline plus cystine or methionine may be particularly effective in the treatment of the early stages of cirrhosis when the liver is large, presumably fatty, and not greatly involved by periportal fibrosis. Because of its known lipotropic activity and availability, choline may be particularly recommended in such cases.

Certain components of the vitamin B complex, notably nicotinic acid and thiamin, may be essential in the treatment of late hepatic insufficiency since, as Jolliffe has shown, many patients who have cirrhosis present themselves with Wernicke's or Korsakoff's syndrome and nicotinic acid deficiency encephalopathies. These may respond to intensive therapy with appropriate fractions of the B- complex.—*From Queries and Minor Notes, J. A. M. A. 131: 873, 1946.*

Distribution of Calcium in Various Parts of Endive and Celery[1]

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KNOWLEDGE of the distribution of calcium in different parts of our common green vegetables is important because green and yellow vegetables are advocated as one of the seven basic foods of the American diet. Cowell (1) of England found that the outer leaves of cabbage had a calcium content 20 or 30 times as great as the inner leaves. Wang (2) of China also found that the outer leaves of cabbage contained more calcium than the inner leaves. He stated that it was regrettable that the farmers usually discard the outer leaves of green vegetables before they are sold. Sheets, Leonard, and Gieger (3) found that green leaves of mature heads of cabbage grown in Mississippi contained about three times as much calcium on the dry basis as the bleached leaves. Mallon and Urey (4) found that the outer leaves of Southern California head lettuce had a calcium content about three times that of the part commonly sold as head lettuce.

The present investigation on endive and celery was made to contribute data to the study of the distribution of calcium in edible plants as well as to add knowledge concerning the calcium content of vegetables grown under known conditions.

EXPERIMENTAL PROCEDURE

The endive or escarole (*Cichorium endivia*) of the strain called broad leaved Batavia, and the Utah type celery used in this investigation were grown by cooperators for the market. All plants were grown in Los Angeles County and were obtained from known sources through the courtesy of A. F. Gillette, assistant county agent, Cooperative Extension Work, University of California. Two lots of endive were grown in two different plots as shown in Table 1.

The endive of Lot 1 grown in Wilmington near the Pacific Ocean was irrigated with well water which had a calcium content of 15 parts per million. The land on which Lot 2 was raised in Van Nuys in the San Fernando Valley north of Los Angeles was irrigated with Los Angeles city water which contained 27 parts per million for its calcium content. The soil used for growing the endive of Lot 1 was Ramona, fine sandy loam, and that for Lot 2 was classified as Handford, fine silt loam.

No dry fertilizer was used on Lot 1, but Lot 2 received 150 lb. of ammonium sulphate and 150 lb. of nitrite of soda per acre. No liquid fertilizer or dust or sprays were used for either lot. Celery was the previous crop grown in Lot 1, and cucumbers in Lot 2. The nine heads of endive for Lot 1 averaged 18 in. in diameter, and the eight heads for Lot 2 averaged 13 in.

The celery used was the Utah type, a strain of green celery. It was grown on two different plots: Lot 1 on the side of Domenguez Hill in Wilmington, Lot 2, in Puente, east of Los Angeles. Lot 1 was irrigated with water which had a calcium content of 15 parts per million; Lot 2 used water with a much higher calcium content, namely, 57.2 parts per million as shown in Table 2.

The soil used for growing the celery in Lot 1 was Ramona, fine sandy loam, and for Lot 2 was Handford, sandy loam. The dry fertilizer for Lot 1 was 3 tons of 8 per cent nitrate of soda, 8 per cent phosphoric acid, and 4 per cent potash, plus 6 tons of poultry manure per acre; that for Lot 2 was 2 tons of 10 per cent nitrogen, 10 per cent phosphoric acid, and 5 per cent potash per acre. No liquid fertilizer was used in either lot. Lot 1 was sprayed once with Bordeaux mixture; Lot 2 was sprayed with Bordeaux mixture and also with pyrethrum and camphor oil. The previous crop grown on the soil for Lot 1 was endive and for Lot 2 was lettuce. The six stalks of celery from each lot were about 4 in. in diameter.

The endive and celery were harvested during the winter months and were immediately taken, including all the leaves or stems, to the Nutrition Laboratory. The outer leaves of the endive were greener

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TABLE 1

*Calcium content of outer and inner leaves of Southern California endive*grown under varying conditions in Los Angeles County, California*

LOT	CONDITIONS OF GROWTH						CALCIUM CONTENT	
	Location	Soil	Dry fertilizer	Spray	Calcium in irrigation water	Previous crop grown in the same soil	Outer leaves (wet basis)	Inner leaves (wet basis)
					parts per million		*mg./100 gm.*	*mg./100 gm.*
1	Wilmington	Ramona, fine sandy loam	None	None	15.0	Celery	105	32
2	Van Nuys	Handford, fine silt loam	150 lb. of ammonium sulphate 150 lb. of nitrite of soda	None	27.0	Cucumbers	116	37

* Strain of broad leaved Batavia or escarole (*Cichorium endivia*) used.

and heavier than the inner part. It was noted that the Utah type celery grown in Wilmington was green throughout.

The outer leaves of the endive and the outer stems of the celery were removed until the plants had the appearance of those sold in the market. They were wiped free from any dirt with absorbent cotton dipped in distilled water, and any excess of adhering moisture was removed with cotton, after which the leaves were weighed. They were then rinsed many times in large amounts of distilled water and later air-dried. The weighed leaves or stems, whether from inner or outer portions of these vegetables, were then further dried in an electric oven at 75°C., ground in an electric grinder, mixed thoroughly, and portions for sampling were stored.

Samples weighing 5 to 6 gm. were measured out, redried at 75°C. in weighed silica crucibles (Coors), and ashed in a muffle furnace. Determinations of calcium were made in triplicate, using the McCrudden (5) method with the *p*H value adjusted according to Shohl and Pedley (6).

RESULTS AND DISCUSSION

The calcium of the outer leaves of the endive (escarole) from Lots 1 and 2 on the 100 gm. wet basis ranged from 105 to 116 mg. respectively, while that of the inner leaves (edible portions) ranged much lower, namely 32 to 37 mg. as shown in Table 1. Hence, there was three times as much calcium in the outer leaves. The higher content of calcium in the outer leaves of endive is in agreement with the higher distribution of calcium in the outer leaves of other thin green leafy vegetables reported by other investigators (1–4).

The calcium of the outer stems of the Utah type celery from Lots 1 and 2 on the 100 gm. wet basis ranged from 57 to 182 mg. respectively, while the inner stems ranged from 32 to 72 mg. as shown in Table 2. There was twice as much calcium in the outer stems. The strain, Crystal White Jumbo Utah, contained the higher percentage of calcium of the two strains of Utah celery analyzed.

TABLE 2

Calcium content of leaves, inner and outer stems of Southern California celery grown under varying conditions in Los Angeles County, California

LOT	CONDITIONS OF GROWTH						CALCIUM CONTENT		
	Location	Soil	Dry fertilizer per acre	Spray	Calcium in irrigation water	Previous crop grown in same soil	Outer stems (wet basis)	Inner stems (wet basis)	Leaves (wet basis)
					parts per million		*mg./100 gm.*	*mg./100 gm.*	*mg./100 gm.*
1*	Wilmington	Ramona, fine sandy loam	3 tons of 8% N, 8% P_2O_5, 4% K_2O, and 6 tons manure	Bordeaux mixture	15.0	Endive	57	32	264
2†	Puente	Handford, sandy loam	2 tons of 10% N, 10% P_2O_5, 5% K_2O	Bordeaux mixture plus pyrethrum and camphor oil	57.2	Lettuce	182	72	236

* Strain of Utah celery used.

† Strain of Crystal White Jumbo Utah celery used.

TABLE 3

*Loss of weight of discarded parts of endive**

LOT	AVERAGE DIAMETER	OUTER LEAVES	INNER LEAVES	DISCARDED LOSS
	in.	*gm.*	*gm.*	%
1	18	3959	3332	54.3
2	13	2400	2059	53.8

* Wet basis.

TABLE 4

*Loss of weight of discarded parts of Utah celery**

LOT	STRAIN	AVERAGE DIAMETER	OUTER STEMS	INNER STEMS	ALL LEAVES	DISCARDED LOSS
		in.	*gm.*	*gm.*	*gm.*	%
1	Utah Crystal, White Jumbo, Utah	4¾	2667	2754	1564	60.6
2		4⅓	1645	3429	2086	52.1

* Wet basis.

The celery leaves containing the leaf blades, petioles, and midribs from both outer and inner stems were analyzed together. It was found that they contained a higher amount of calcium than either the outer or the inner stems. On the 100 gm. wet basis, the calcium of the leaves ranged from 236 to 264 mg. as shown in Table 2. These results are similar to those obtained from a comparable investigation of broccoli by Sherman and Ragan (7) who found that broccoli purchased in a New York City market had a higher percentage of calcium in the leaves than in the edible stems and flower.

The outer leaves of endive, which were discarded in order to have the head similar to that purchased in the market, represent a loss of 53.8 to 54.3 per cent of weight on the wet basis for the two lots as shown in Tables 3 and 4. The outer stems and all the leaves of the celery represent a loss of 52.1 to 60.6 per cent for both lots. Thus, about one half of both vegetables, by weight, is usually discarded by truck gardeners, or in large institutions by persons who prepare vegetables for consumption. Encouragement should be given to use these edible parts.

SUMMARY

The distribution of calcium in endive (escarole) and in Utah type celery (a green celery) was investigated. Both plants were grown near Los Angeles and were obtained from known sources as to type of soil, fertilizers, and previous crop. The plants, as harvested, were brought to the laboratory and the outer parts were removed until the vegetables appeared similar to those purchased in the market.

The calcium of the outer leaves of endive (escarole) ranged from 105 to 116 mg., and the inner leaves ranged from 32 to 37 mg. on a wet basis per 100 gm. The outer leaves contained three times as much calcium as the inner leaves.

The calcium of the outer stems of Utah type of celery ranged from 57 to 182 mg., and the inner stems ranged from 32 to 72 mg. on a wet basis per 100 gm. The outer stems contained twice as much calcium as the inner stems.

The celery leaves, including leaf blades, petioles, and midribs, contained the highest amount of calcium in the plant. On the 100 gm. wet basis, the calcium ranged from 236 to 264 mg.

The parts of endive and celery which are usually discarded by truck gardeners represent a loss of about one half of the weight of these vegetables.

REFERENCES

(1) COWELL, S. J.: A note on the calcium content of cabbage. Biochem. J. 26: 1422, 1932.
(2) WANG, C. F.: The distribution of calcium, phosphorus and iron in leafy vegetables. Chinese J. Physiol. 10: 651, 1936.
(3) SHEETS, O., LEONARD, O. A., AND GIEGER, M.: Distribution of minerals and vitamins in different parts of leafy vegetables. Food Research 6: 553, 1941.
(4) MALLON, M. G., AND UREY, F. P.: The calcium content of Southern California head lettuce and its distribution in the outer and inner leaves. J. Home Econ. 33: 182, 1941.
(5) MCCRUDDEN, F. H.: The determination of calcium in the presence of magnesium and phosphates: The determination of calcium in urine. J. Biol. Chem. 10: 187, 1911–12.
(6) SHOHL, A. T., AND PEDLEY, F. G.: A rapid and accurate method for calcium in urine. J. Biol. Chem. 50: 537, 1922.
(7) SHERMAN, H. C., AND RAGAN, M. S.: Quantitative distribution of phosphorus and calcium in certain fruits and vegetables. J. Nutrition 23: 283, 1942.

Carbonated "Cola" Beverages for Young Children

IN A REPORT of the Council on Foods and Nutrition in the J. A. M. A., November 7, 1942, it is stated that the use of caffeine by children is not considered wise, but especially undesirable is the fact that the use of sweetened drinks displaces the use of other foods. Sweetened drinks tend to replace that important part of a child's diet—milk.

With older children it is obvious that a school lunch suffers gross deterioration when the beverage chosen in place of milk is a solution of sugar in flavored water. It is also generally conceded that excessive sugar eating between meals or sugar eaten in small amounts within an hour of the regular meal time, impairs the appetite for foods at meals.

Many investigators have attributed harmful effects to the teeth to the excessive use of highly refined sugars. The indiscriminate and uncontrolled supply of poor food for consumption between meals cannot be condoned with impunity.—*From Queries and Minor Notes, J. A. M. A., 131: 800, 1946.*

The Retention of Thiamin and Riboflavin in Beef Cuts During Braising, Frying, and Broiling[1]

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DURING the last few years the vitamin content of meats and meat products have been determined in several laboratories (1–12). A number of the studies made have included work on the retention of B vitamins during the cooking of pork, lamb, and veal but few on retentions during the cooking of beef. The investigations on beef include one on the retention of four of the B vitamins in rare and well done rib roasts (4) and another on retention of nicotinic and pantothenic acids during the braising of pot roasts as well as frying and broiling of steaks (8).

The present study was designed to measure the retention of thiamin and riboflavin in beef cooked by braising, frying, and broiling. The cuts of beef were obtained in the local market and cooked under standard conditions (13). Heel-of-round and chucks were braised, round steaks fried, and loin-end steaks broiled.

In addition, determinations were made of the retention of vitamins in sliced chuck pot roasts and drippings after holding over a simulated steam table for 1½ hr.

Because certain discrepancies have been found (4, 14) between thiamin values obtained on beef by two different applications of the thiochrome method, (15, 16) both types of assays were carried out in nine of the experiments on braising heel-of-round and in five of those on braising chuck to obtain a comparison of values from these two assay methods.

EXPERIMENTAL METHODS

Methods of Cooking

Braising: Heel-of-round cuts were braised on top of the stove, in the oven, and in the pressure saucepan. Chuck cuts were braised on top of the stove only. The method of braising on top of the stove was the same as that described by Meyer *et al.* (8). For the oven method the searing in the open pan was done in a 450°F. oven and the cooking completed in the covered pan in a 300°F. oven. For the pressure saucepan method, the searing was done on the stove in the saucepan itself. Then both a maximum thermometer and a regular thermometer were inserted in the meat and it was cooked under pressure for a period of time predicted from preliminary test cookings to give as nearly as possible 93°C. internal temperature. In all cases the same amount of water, 50 ml., was added.

Frying: Round steaks approximately ½ in. thick, pounded and cut into pieces about 4 by 2 in. were fried for 2 min. on each side in a hot frying pan in which a small amount of fat from the cut had been rendered. Not more than four or five pieces were cooked at one time and a full gas flame was maintained throughout the frying to prevent much dripping from the meat. In these experiments no temperatures were measured.

Broiling: Loin-end cuts were placed on a preheated broiler 6 to 8 in. from the flame with a thermometer inserted in the steak and another balanced over the top of the meat so that the temperature at which the meat was broiled could be measured and controlled. The rare-medium steaks were turned after the internal temperature reached 40°C. and cooking continued to 58°C. The medium-well done steaks were turned at 58°C. and cooked to 70°C. In each case the temperature over the steaks was maintained at 160 to 170°C. This temperature was held by setting the oven regulator and leaving the door ajar.

Assay Methods

In the case of chucks as well as round and loin-end steaks, paired cuts were obtained from the right and left quarters of the same animal and in each instance one cut was analyzed raw and the other after cooking. For only one of the experiments with heel-of-round was it possible to purchase paired cuts. In the others 1- to 2-lb. raw samples were

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obtained by taking slices from several surfaces to represent all muscles insofar as possible.

Preparation of the raw meat, cooked meat, and drippings for the determination of fat-free-dry weights and for the vitamin analyses were performed as described for the determination of riboflavin by Hinman *et al.* (17). In all cuts which contained bones, i.e. all cuts except heel-of-round, the meat was cooked attached to the bones and then separated as quantitatively as possible for preparation of the sample. Although the weight of the cooked meat containing the bones was used for determination of cooking weight losses, only the total weight of the separated, ground, cooked meat was used in calculating vitamin retentions. The methods used for the determination of fat-free-dry residues in meat samples and drippings as well as the scheme of calculation employed for finding retentions of vitamins during cooking have been described (17).

A method of double adsorption of thiamin and riboflavin was used for all experiments. The technique was essentially that of Conner and Straub (18) with the modifications in the digestion, adsorption, reactions, and fluorophotometry which have already been described (14, 17, 19). In those experiments where two thiochrome methods were employed, the first was that of Hennessy and Cerecedo (15), the second was that of Harris and Wang (16, 20), in which papain and clarase were used in the preparation of digests.

Differences between the thiamin retentions for any two methods of cooking were considered to be significant at the 5 per cent level, if they were equal to or greater than the least significant difference as determined by the following formula:

$$\text{L.S.D.} = t(n_1 + n_2 - 2)\sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)\frac{\Sigma(x_1 - \bar{x}_1)^2 + \Sigma(x_2 - \bar{x}_2)^2}{n_1 + n_2 - 2}}$$

RESULTS AND DISCUSSION

The weight losses in cooking 30 samples of beef are summarized in Table 1. The average losses for braising by different methods are similar. The time per lb. for braising heel-of-round in the pressure saucepan was about one third as long as by the other methods; however, this did not affect cooking weight losses.

Thiamin retentions by different cooking methods, (Table 2) show plainly that a longer cooking process, such as braising, results in more destruction of thiamin.

In braising, the average retention of thiamin in the meat was 40 per cent. This value compares well with those reported by McIntire *et al.* (5, 6) who obtained 50 per cent thiamin retention in braised pork loins and 40 per cent in braised veal. The drippings contained 21 per cent of the original thiamin showing the extractive effect of long slow cooking and this again agrees with McIntire *et al.* (5) who found 24 per cent of the thiamin in drippings from braised pork loin.

The heel-of-round roasts cooked under pressure showed an average total thiamin retention which was slightly but significantly higher than that in similar roasts cooked on top of the stove. This might have been due to the shorter cooking periods. Also chuck roasts braised on the top of the stove showed significantly better total retention of thiamin than heel-of-round cooked by the same method. However, the difference does not correlate with an appreciable difference in cooking time.

The frying experiments gave the highest total retention of thiamin, 90 per cent. The broiling experiments gave thiamin retentions in the order which might be expected, 84 per cent for rare-medium and 77 per cent for medium-well done steaks. However, the successive differences between these averages were not statistically significant. Schweigert *et al.* (7) also obtained the greatest total retention of thiamin in frying of pork, 92 per cent, and in broiling of lamb, 80 per cent (6).

There was no loss of riboflavin in any of the longer methods of cooking, in fact there seems to be an increase in some cases. In braising, four fifths of the riboflavin was found in the meat and the rest extracted in the drippings. The total riboflavin retention in meat plus drippings in individual experiments ranged from 91 to 129 per cent in all methods of braising.

Since the group average retention of this vitamin was the highest in the case of chuck, it was thought possible that the extraction of riboflavin from the bones might have contributed somewhat to the excess

TABLE 1

*Summary of cooking data**

METHOD OF COOKING	RAW WEIGHT	TIME PER POUND†	COOKING LOSSES		
			Volatile	Drippings	Total
	lb.	*min.*	%	%	%
Braising					
Heel-of-round					
Oven	3.9	48.8	6	27	33
Top of stove	4.1	47.8	11	25	36
Pressure saucepan	3.5	15.4	12	22	34
Chuck					
Top of stove	4.4	46.0	6	23	29
Frying					
Round	2.6	4.0	14	1	15
Broiling					
Loin					
Medium-well done	3.9	14.0	24	4	28
Rare-medium	3.9	8.0	17	3	20

* Each figure is an average of four or five determinations

† Includes searing time.

TABLE 2

*Retention of thiamin and riboflavin in different beef cuts**

METHOD OF COOKING	THIAMIN†						RIBOFLAVIN					
	In meat		In drippings		In meat plus drippings		In meat		In drippings		In meat plus drippings	
	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average	Range	Average
	%	%	%	%	%	%	%	%	%	%	%	%
Braising												
Heel-of-round												
Oven	31–43	38	13–31	23	51–74	61	77–99	86	20–29	25	102–128	111
Top of stove	31–40	35	13–20	17	49–53	51	69–94	80	20–24	21	91–114	101
Pressure saucepan	37–52	47	13–21	18	51–73	65	69–92	81	25–32	28	96–118	109
Chuck												
Top of stove	38–45	42	20–30	25	60–73	67	85–88	87	27–35	30	112–129	118
Total average		40		21		61		84		26		110
Frying												
Round	84–93	89	0–1	1	85–93	90	96–99	98	1–3	2	99–101	100
Broiling												
Loin												
Medium-well done	61–80	70	5–9	7	68–87	77	87–97	92	3–6	5	93–102	97
Rare-medium	73–83	77	6–8	7	80–89	84	82–102	92	4–5	4	87–106	96

* Figures for each method are based on an average of four or five cookings.

† All figures are based on values obtained by Hennessy thiochrome method.

found in the cooked product. To check this, bones removed from two raw chuck samples were cooked in the same manner as the braised meat except that searing was omitted. Vitamin analysis of the cooking liquor proved that there was not enough riboflavin extracted from the bones to contribute materially to the high cooking retentions. The total amounts extracted indicated that at the most 3 to 5 per cent could have been added to riboflavin retention figures obtained in the chuck braising experiments. Moreover, it was probable that even less than this had been extracted from the bones during braising of the meat since in such cooking the bone surface was less exposed. The riboflavin retentions exceeding 100 per cent have been discussed (17).

The total riboflavin retentions in the quicker methods of cooking were not excessively high, ranging from 87 to 106 per cent but showing averages for each of these methods close to 100 per cent. In these instances only from 2 to 5 per cent were found in the drippings. The Wisconsin workers (6, 7) obtained similar results for total riboflavin retention varying from 87 to 101 per cent during frying and broiling of pork, lamb, and veal.

The results obtained from holding slices of chuck pot roast with drippings for 1½ hr. over steam showed retentions of thiamin ranging from 72 to 92 per cent and averaging 86 per cent of that present in the cooked product before holding; and of riboflavin ranging from 88 to 111 and averaging 100 per cent.

TABLE 3

*Average thiamin and riboflavin content of beef cuts**

CUT	NO. OF SAMPLES	THIAMIN†				RIBOFLAVIN			
		Raw		Cooked		Raw		Cooked	
		Range	Average	Range	Average	Range	Average	Range	Average
		mcg./gm.	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*
Heel-of-round	14	0.71–1.40	0.93	0.42–0.74	0.56	1.33–2.09	1.71	1.70–2.61	2.15
Chuck	5	0.73–1.06	0.88	0.51–0.67	0.57	1.60–2.30	1.96	2.38–3.26	2.65
Round steak	4	1.03–1.23	1.13	1.06–1.22	1.14	1.61–2.11	1.83	1.76–2.35	2.05
Loin steak	8	0.86–1.58	1.14	0.80–1.70	1.10	1.45–2.23	1.90	1.61–2.74	2.28

* Mcg. per gm. moist weight.

† Thiamin values are by Hennessy method.

The values obtained for thiamin content of raw beef by the Hennessy and Cerecedo method (15) (Table 3) are in good agreement with those of previous workers. These values as well as those determined by the Harris method (16) (Table4), regardless of cut, fell nicely into the middle of the wider range found in the literature as reviewed by several authors (3, 4, 12, 14). Likewise, the riboflavin values (Table 3) agree well with others reported for raw beef (2, 4, 12).

The comparison of two (15, 16) thiochrome techniques is shown in Table 4. The Harris thiamin values on individual samples were generally higher than for the Hennessy both for raw and cooked meat, but in the case of the raw the differences were only slight for most samples. The relatively greater discrepancies between the two values for the cooked samples show up as a somewhat higher retention of thiamin in the meat as determined by the Harris method (Table 5). On the other hand, in the case of the drippings, the Harris method gave consistently lower results, varying by 10 to 31 per cent from the Hennessy values. However, it was felt that the Harris values on the drippings were questionable since there was difficulty in obtaining checks on duplicate determinations. The presence of dark colored substances in the drippings resulting from the high temperatures used in searing made it necessary to use much larger amounts of potassium ferricyanide for complete oxidation and simultaneously interfered with the detection of the first excess of this reagent. Attempts to increase values in these drippings by the addition of 12 to 20 extra drops of ferricyanide were unsuccessful. Nevertheless, the averages of replicates were used to determine what proportion of the original thiamin extracted from the meat was retained in the drippings (Table 5) and these percentages were generally lower than those based on the Hennessy values. Hence the lower results on drippings by the Harris method cancel out to some extent the higher ones on cooked meat, and the final total retentions by the two methods are thus not appreciably different from one another.

TABLE 4

*Average thiamin content in braised pot roasts analyzed by Hennessy (15) and Harris (16) techniques**

CUT AND BRAISING METHOD	NUMBER OF SAMPLES	AVERAGE THIAMIN CONTENT OF BEEF					
		Raw		Cooked		Drippings	
		Hennessy	Harris	Hennessy	Harris	Hennessy	Harris
		mcg./gm.	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*	*mcg./gm.*
Heel-of-round							
Oven	2	0.75	0.75	0.47	0.62	0.73	0.56
Top of stove	3	0.77	0.88	0.44	0.59	0.80	0.64
Pressure saucepan	4	0.90	0.90	0.65	0.77	0.70	0.56
Chuck							
Top of stove	5	0.88	0.94	0.57	0.74	0.82	0.73

* Mcg. per gm. moist weight.

SUMMARY

The thiamin and riboflavin contents of four cuts of beef before and after cooking by braising, frying, and broiling were determined, and from these the proportions of the two vitamins retained in the meat as well as those extracted in the drippings were calculated.

The total retention of thiamin in the meat plus the drippings depended on the time of cooking. Thus, the following averages were obtained: braising, 61 per cent; broiling, 80 per cent; and frying, 90 per cent. Heel-of-round braised in the pressure saucepan and chuck braised on top of the stove showed significantly higher thiamin retentions than heel-of-round braised on top of the stove. The total riboflavin retention was approximately 100 per cent in all methods, but showed a decided trend to exceed 100 per cent during braising.

On the average, 21 per cent of the thiamin and 26 per cent of the riboflavin were found in the drippings from braised cuts, while only 7 per cent of the thiamin and 5 per cent of the riboflavin were found in the drippings from broiled steaks, and 1 and 2

TABLE 5

Comparison of thiamin retention in braising beef analyzed by Hennessy (15) and Harris (16) techniques

CUT AND BRAISING METHOD	COMPARISON OF PERCENTAGE RETENTION OF THIAMIN IN MEAT						ROAST AND DRIPPINGS HELD ON STEAM TABLE	
	Roast		Drippings		Total			
	Hennessy	Harris	Hennessy	Harris	Hennessy	Harris	Hennessy	Harris
	%	%	%	%	%	%	%	%
Heel-of-round								
Oven	41	54	22	17	63	70		
Top of stove	36	42	15	10	51	52		
Pressure saucepan	47	56	18	14	65	70		
Chuck								
Top of stove	42	47	25	21	67	67	86	97

per cent of these two vitamins respectively, in the drippings from fried steaks. These results are compatible with the variation in the quantity of drippings obtained in the several methods of cooking.

Sliced pot roasts and drippings held over a simulated steam table for 1½ hr. retained 86 per cent of the thiamin and 100 per cent of the riboflavin which were originally present in the cooked product.

The total retentions of thiamin in braised beef when analyzed by the Hennessy and Cerecedo base exchange and the Harris and Wang non-adsorption techniques, are similar.

REFERENCES

(1) Brady, D. E., Peterson, W. J., and Shaw, A. O.: Riboflavin and thiamin contents of pork loin muscles and their retention during cooking. Food Research 9:400, 1944.

(2) Brady, D. E., Peterson, W. V., and Shaw, A. O.: Riboflavin content of beef. Food Research 9: 406, 1944.

(3) Chedelin, V. H., and Williams, R. J.: The B vitamin content of foods. University of Texas Publication, No. 4237, 1942.

(4) Cover, S., McLaren, B. A., and Pearson, P. B.: Retention of the B-vitamins in rare and well-done beef. J. Nutrition 27: 363, 1944.

(5) McIntire, J. M., Schweigert, B. S., Henderson, L. M., and Elvehjem, C.A.: The retention of vitamins in meat during cooking. J. Nutrition 25: 143, 1943.

(6) McIntire, J. M., Schweigert, B. S., and Elvehjem, C. A.: Retention of vitamins in veal and lamb during cooking. J. Nutrition 26: 621, 1943.

(7) McIntire, J. M., Schweigert, B. S., Herbst, E. J., and Elvehjem, C. A.: Vitamin content of variety meats. J. Nutrition 28: 35, 1944.

(8) Meyer, B. H., Hinman, W. F., and Halliday, E. G.: The retention of some vitamins of the B-complex in beef during cooking. Food Research: In press.

(9) Rice, E. E., and Robinson, H. E.: Vitamin B-complex studies on dehydrated meats. Food Research 9: 92, 1944.

(10) Schweigert, B. S., McIntire, J. M., and Elvehjem, C. A.: The retention of vitamins in meats during storage, curing and cooking. J. Nutrition 26: 73, 1943.

(11) Schweigert, B. S., McIntire, J. M., and Elvehjem, C. A.: The retention of vitamins in pork hams during curing. J. Nutrition 27: 419, 1944.

(12) Waisman, H. A., and Elvehjem, C. A.: The Vitamin Content of Meat. Minneapolis: Burgess Publishing Co., 1941.

(13) Meat and Meat Cookery. Chicago: National Live Stock and Meat Board, 1942.

(14) Hinman, W. F., Halliday, E. G., and Brookes, M. H.: Thiamine in beef muscles. Indust. & Engin. Chem. Anal. Ed. 16: 116, 1944.

(15) Hennessy, D. J., and Cerecedo, L. R.: The determination of free and phosphorylated thiamine by a modified thiochrome assay. J. Am. Chem. Soc. 61: 179, 1939.

(16) Harris, L. J., and Wang, Y. L.: An improved procedure for estimating vitamin B_1 in foodstuffs and biological materials by the thiochrome test including comparisons with biological assays. Biochem. J. 35: 1050, 1941.

(17) Hinman, W. F., Tucker, R. E., Jans, L. M., and Halliday, E. G.: Excessively high riboflavin retention during braising of beef. Indust. & Engin. Chem. Anal. Ed. 18: 296, 1946.

(18) Conner, R. T., and Straub, G. J.: Combined determination of riboflavin and thiamin in food products. Indust. & Engin. Chem. Anal. Ed. 13: 385, 1941.

(19) Brush, M. K., Hinman, W. F., and Halliday, E. G.: The nutritive value of canned foods. J. Nutrition 28: 131, 1944.

(20) Wang, Y. L., and Harris, L. J.: Further notes on the estimation of vitamin B_1 by the thiochrome method. Chem. & Industry 61: 27, 1942.

Circulatory Disturbances During Hunger Edema

PATIENTS with hunger edema treated by Cardozo and Eggink complained of fatigue, weakness, and nycturia. They were slow in thinking and acting. The skin was hyperthermic and slightly cyanotic and had the faded yellowish color seen in secondary shock. The edema developed first in the lower part of the legs and under the eyes. Hunger edema was not seen in young men and children; it appeared occasionally in women, but chiefly in men over 40. The pulse was slow, the blood pressure was low, and the heart sounds were weak. There was mild anemia, moderate reduction in the serum protein, slight increase in the urea and often a raised alkali reserve. The circulation time was prolonged in 22 of the 29 patients. The same condition was present in 4 of 5 undernourished patients who as yet had no hunger edema. The majority of these patients had bradycardia and hypotension. Electrocardiography revealed that the ventricular complexes were low in all leads. The basal metabolic rate was reduced. The authors think that there is a connection between bradycardia, hypotension, retarded circulation, and low metabolism and that reduced plasma protein and hemostasis resulting from retarded circulation are important in the development of hunger edema. A high caloric, high-protein diet is of great therapeutic value, but, if food absorption is impaired, infusion of large quantities of plasma is advisable. *Cardozo, E. Lopes and Eggink, P.: Nederlandsch Tijdschrift v. Geneeskunde, Amsterdam. 90: 258, 1946. From Current Medical Literature, J. A. M. A. 131: 1178, 1946.*

Appointments, Army Medical Department Dietitians

The following Medical Department Dietitians were appointed during the month of August, 1946.

Adney, Betty J.: Utah State Agricultural College; Walter Reed General Hospital
Bender, Alice L.: Pennsylvania State College; Walter Reed General Hospital
Branyon, Jean M.: Alabama College; Walter Reed General Hospital
McIntosh, Lena: University of Wyoming; Walter Reed General Hospital
Page, Louise: Utah State Agricultural College; Walter Reed General Hospital
Robinson, Jean B.: Simmons College; Walter Reed General Hospital
Schlotterbeck, Louise: University of Connecticut; Walter Reed General Hospital
Schneider, Joan N.: Clarke College; Walter Reed General Hospital
Stark, Helen L.: Oklahoma Agricultural and Mechanical College; Walter Reed General Hospital
Watson, Claire M.: Regis College; Walter Reed General Hospital

Promotions, Army Medical Department Dietitians

The following Medical Department Dietitians have been promoted during the month of August, 1946. They are on duty in Army hospitals in this country and overseas.

First Lieutenant to Captain

Heard, Olga S., R-75
Huston, Nancy L., R-313
Lipscomb, Mary, R-1114
Pierson, Florence B., R-656
Richardson, Velma L, R-68

Second Lieutenant to First Lieutenant

Fuller, Caroline P., R-2206
Gable, Elizabeth, R-2127
Hughes, Kathleen V., R-2121
Jensen, Edith I., R-2287
Kacer, Elsie J., R-2302
Koshetz, Rose, R-2180
Miller, Dot, R-2212
Waldmiller, Frieda P., R-2196

Army Medical Department Dietitians Recalled to Active Duty[1]

The following Medical Department Dietitians, all 1st Lieutenants, previously reported as separated have been recalled to active duty.

Timerman, Mary L., R-170
Stinson, Edna E., R-250
McAndrew, Catharyn K., R-665
Magee, Mary E., R-77

[1] 1st Lt. Elizabeth Cleghorn, Medical Department Dietitian, previously reported as recalled to active duty was an error.

Army Medical Department Dietitians Separated from the Service[1]

The following dietitians have been separated under the provisions of the Separation Policy established by the Surgeon General for Medical Department Dietitians.

Captains

Green, Charlotte B., R-262, 806 East Grand Blvd., Detroit, Mich.

First Lieutenants

Bankhead, Olga J., R-1398, 719 Park Ave., Linden, N. J.
Benton, Bertha J., R-1206, 2504 Crane Ave., Detroit, Mich.
Ehrenfelt, Alice E., R-1240, Bayview Ave., Belvedere, Calif.
Farner, Lois E., R-1367, Colfax, Wis.
Finch, Helen E., R-850, Indian Hill Ave., Cincinnati, Ohio
Hawes, Martha J., R-1404, 836 S. College St., Tyler, Tex.
Holbert, Mary H., R-2123, Sterling, Kans.
Hoole, Marguerite C., R-2048, 25 Beaver St., New York, N. Y.
Jones, Virginia L., R-1394, 627 38th St., West Palm Beach, Fla.
Kelly, Eileen L., R-750, 2952 N. Frederick, Milwaukee, Wis.
Kibler, Alta E., R-1265, Hudson, Ohio
McMurray, Ellen M., R-1026, 1627 South 20th St., Chickasha, Okla.
Mack, Roberta, R-1324, 440 E. 8th St., Michigan City, Ind.
O'Connor, Ursula M., R-114, State Teachers College, Framingham, Mass.
Quinn, Marie L., R-77Í, 4006 West Nelson St., Chicago, Ill.
Rubenstein, Matilda, R-115, 264 Belmont Ave., Haledon, N. J.
Schaeffer, Helen L., R-2232, Etna, Pa.
Scialla, Katherine, R-2057, 2870 Valentine Ave., Bronx, N. Y.
Spehar, Anne D., R-983, Box 6, McKinley, Minn.
Wallace, Ruth E., R-1421, 1527 Corcoran St., Washington, D. C.
Wedlake, Gwen H., R-666, 345 Colusa Ave., Berkeley, Calif.

Second Lieutenants

Champion, Jane C., R-1230, 6532 N. Oshkosh Ave., Chicago, Ill.
Klehm, Constance J., R-2382, Box 171, Jacksonville, Tex.
Koch, Rachel F., R-2266, Ida Grove, Iowa
Nelson, Kristena E., R-2207, 502 South 11th St., San Jose, Calif.
Saklem, Marjorie H., R-2359, 5329 North Wayne Ave., Chicago, Ill.
Scanland, Lillian M., R-2487, 3611 North Shartel, Oklahoma City, Okla.
Schiebel, Mary J., R-2340, 4619 Munger Ave., Dallas 4, Tex.
Weakley, Hazel R., R-2295, Route 3, Shelbyville, Ky.
Williams, Mary D., R-2166, Townville, S. C.

[1] 2nd Lt. Mary C. Casey, R-2242, was not separated as reported in July, 1946.

New Appointments, Veterans Administration

The following hospital appointments of dietitians (not previously announced) have been made by the Veterans Administration.

NAME	POSITION	LOCATION
	Branch No. 3	
Catherine M. Bardsley	Head Dietitian	Butler, Pa.
Mary A. Kervin	Staff Dietitian	Lyons, N. J.
Dorothy V. Thoman	Staff Dietitian	Lyons, N. J.
	Branch No. 4	
Elinor J. Benson	Staff Dietitian	Roanoke, Va.
Ruth L. Ludtke	Staff Dietitian	Ft. Howard, Md.
	Branch No. 6	
Winifred L. Castle	Staff Dietitian	Dayton, Ohio
Helen Clarke	Asst. Chief Dietitian	Cleveland, Ohio
Margery A. Eaton	Staff Dietitian	Louisville, Ky.
Marion Kutnick	Staff Dietitian	Dayton, Ohio
Dorothy M. Ruggles	Head Dietitian	Cleveland, Ohio
Jennie S. Pruitt	Staff Dietitian	Ft. Custer, Mich.
	Branch No. 7	
Mary Jane Bliss	Head Dietitian	Downey, Ill.
Ruth M. Kahn	Chief Dietitian	Hines, Ill.
Marion Kohlmetz	Staff Dietitian	Wood, Wis.
Angela Murphy	Staff Dietitian	Hines, Ill.
Patricia Thompson	Staff Dietitian	Hines, Ill.
Patricia Weixel	Staff Dietitian	Hines, Ill.
	Branch No. 9	
Doris E. Dyal	Staff Dietitian	Topeka, Kans.
	Branch No. 10	
Helen Lynch	Head Dietitian	New Orleans, La.
Margaret Wade	Staff Dietitian	Dallas, Tex.
	Branch No. 11	
Ethel McIntyre	Staff Dietitian	Walla Walla, Wash.
Elizabeth Cleghorn	Staff Dietitian	Barnes Annex, Portland, Ore.
	Branch No. 12	
Dorothy Tomlinson	Staff Dietitian	Van Nuys, Calif.
	Branch No. 13	
Ella Mae Kusterer	Chief Dietitian	Albuquerque, N. M.
Margaret Geders	Staff Dietitian	Albuquerque, N. M.
Anne Pederson	Staff Dietitian	Cheyenne, Wyo.
Inez Stocking	Chief Dietitian	Ft. Logan, Colo.

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Pseudo-scientific Treatment of Diabetics

The National Better Business Bureau, New York City, recently issued a report concerning the Kaadt Diabetic Institute in South Whitley, Indiana. This institute, operated by Dr. Charles Frederick Kaadt, offers diabetics relief or recovery without the use of insulin or a restricted diet, except for a few short weeks. In taking diabetics who need it, off insulin and diet therapy, Dr. Kaadt, a licensed physician, flouts the treatment universally recognized by the medical profession. The fates of 17 patients who had undergone Dr. Kaadt's treatment, were recently reported by a Pittsburgh doctor in the *J. A. M. A.* Of the 17, 12 developed diabetic coma and were taken as emergency cases in various hospitals after the coma had existed for some time. Of these, five patients died.

According to the Better Business Bureau's report, Dr. Kaadt formerly offered his treatment by mail. However, after an investigation by the Post Office Department, he now urges patients by mail to come to the Institute for diagnosis and treatment. Patients go for a three-day visit, at $10 per day. There they are given a jug of cidar-vinegar-like liquid for which they pay $30, plus a box of tablets of unknown composition and some dietary advice. Dr. Kaadt's "come on" literature states that his treatment "is free from prolonged or continuous dieting" and that "in the majority of cases the patient resumes a normal diet within two or three weeks after beginning treatment." Thus, by providing alleged medicines to be taken by mouth and normal diet after a few weeks, diabetics are offered easy and pleasant substitutes for the treatment generally prescribed—insulin administration where needed and diet restriction.

Editorial

THE QUEEN CITY—SCENE OF A.D.A ANNUAL MEETING

The 29th annual meeting of the American Dietetic Association which convenes on Monday, October 14, at the Netherland Plaza Hotel in Cincinnati bids fair to be the most memorable in the Association's history, with attendance records broken by several hundred registrants. The flavor of internationalism will permeate the convention, with the keynoting session devoted to global nutrition. Among the speakers at this meeting will be Dr. James A. Doull, medical director, U. S. Public Health Service, whose subject will be "The World Health Organization and Global Nutrition." Not only are speakers from other countries included on the program, but a number of foreign visitors are expected. The Association has been informed that several representatives of the British Ministry of Food are coming to this country especially for this meeting, and a number of other people prominent in medical and nutritional circles in other countries now in the United States plan to attend.

With Cincinnati as the city, relaxation as well as mental stimulation can be anticipated by members attending the convention, for the Queen City offers many pleasures for visitors. The University of Cincinnati campus, included in one of the sightseeing tours, is in itself a beautiful sight, while the wide parkways and the two- and three-level homes built on the sides of the city's hills are most interesting and picturesque. Three nation-famous stores—Pogue's, Mabley and Carew, and Shillito's—show the latest fashions and offer many delights for shoppers. The Ohio waterfront is a fascinating, place where typical river boats, such as those operated by the long-established Green Line, may be seen plying the river as they have done since long before the turn of the century.

And last, but by no means least, the Netherland Plaza, headquarters hotel, is a show place in its own right. From the hotel one may look across the Ohio for miles into the Kentucky hills. One of the finest hotels in the nation, its decorating schemes and service are unsurpassed. Every room has a radio speaker, and the arcade offers shops selling a large variety of items. The dining and entertainment facilities are superb. The Restaurant Continentale offers entertainment by name bands plus an ice show, while the Pavillon Caprice and the Hall of Mirrors are magnificent banquet and dining rooms. Members unable to obtain rooms at the Netherland Plaza will find compensating pleasures at nearby hostelries, such as the traditionally excellent Gibson and Sinton Hotels, only a stone's throw from the Netherland Plaza and famous Fountain Square.

PRACTICAL APPROACH TO FEEDING CHILDREN

Dr. Benjamin Spock's recently published, up-to-date book[1] for parents titled *The Common Sense Book of Baby and Child Care* deals with more than 500 topics covering infant and child care through adolescence. Dr. Spock, who is a practicing children's doctor on the staff of Cornell Medical College and New York Hospital, gives practical, easy-to-understand answers to questions and problems that arise in the physical care as well as the psychological care of children. He skillfully avoids the rigidity and authoritarianism of a decade ago and uses, instead, a flexible and interpretative approach. As a result, for the first time, we have a book that combines basic physical and medical information with psychological interpretation. After reading this book, one will readily agree with Dr. C. A. Aldrich that "One is immediately struck with Dr. Spock's friendliness toward people who are to read the book, and there is not a vestige of the carping criticism so often found in such works."

The dietitian and the nutritionist will see new vistas in this combined approach. Dietary recommendations are made with a full awareness of the psychological implications—a goal which the dietitian has only vaguely sensed. Here are tangible recommendations and interpretations from which the dietitian and the nutritionist can evaluate her own instructions to parents and children. Over 100 pages are devoted to the problems of feeding: what feeding means to the baby, schedules, the value of breast feeding, bottle feeding, formulas, preparing the formula, giving the bottle, adding vitamins and water, weaning, getting enough to eat, adding solid foods, elements in the diet, foods and meals, feeding

[1] New York: Duell, Sloan & Pearce, Inc., 1946. Cloth. Pp. 527. Price, $3.

between meals, common kinds of indigestion, thin children, fat children, and feeding problems.

The flexibility with which recommendations for feeding are given will permit the mother greater freedom in the interpretation of the needs of her child. For example, under the section entitled "Foods and Meals," Dr. Spock poses a common problem and suggests a common sense solution: "Suppose a child has refused vegetables in any form for a week. Will his nutrition suffer? Vegetables are particularly valuable for various minerals and vitamins, and also for roughage. But a variety of fruits will supply many of the minerals and vitamins, and the same amount of roughage. If the child is taking his fish-liver oil, milk, meat, and egg, he will be getting the other salts and vitamins that fruits do not provide so well. In other words, if your child dislikes vegetables but likes fruits, don't fuss about what he is missing. Serve him fruit two or three times a day and forget about vegetables for a few weeks. If you don't make an issue about them, the chances are great that his appetite will swing around to them again in time."

In considering cravings for sweets, he states, "I think much of the exaggerated craving for sweets is caused unwittingly by parents. A mother, trying to get her child to finish his vegetable, will say 'You can't have your ice cream until you've finished your spinach.' When you hold back on food (or a prize of any kind), it whets the desire. This has exactly the opposite effect from what the mother wants: the child gets to despise spinach and cereal and to want ice cream and candy more . . . Never hold back on one food until another is eaten. Let your child go on thinking his plain foods are just as good as his sweet ones. If, one day, he catches sight of his dessert first and asks for it, let him have it right away, willingly."

Many pertinent points may also be noted by the dietitian or nutritionist who must make recommendations to parents regarding the thin child, the fat child, and other special feeding problems. Even though the book is specifically written for popular consumption, it will certainly command the respect and approval of all dietitians and nutritionists interested in the care of the whole child.

LIBERAL INFANT FEEDING

Opinions from Our Readers

The paper on "Liberal Infant Feeding" published in the July issue of the JOURNAL describes the self-demand plan for infant feeding. This plan is not only opposed to the common practice of feeding infants according to a rigid schedule, but also advocates the use of prepared formula composed only of evaporated milk and water with the omission of the customary supplement of carbohydrate.

Since this subject is controversial, the editors were pleased to receive comments, criticisms, and opinions from dietitians and nutritionists prominent in public health and clinical nutrition programs. These opinions will be of particular interest to those who are considering the adoption of such an infant feeding program.

Almost all agreed that the self-demand plan has merits. Elizabeth Caso, acting director of dietetics, Peter Bent Brigham Hospital, wrote, "Certainly this technique of gratifying hunger pains is basic in the early establishment of pleasurable reactions to food. As one authority has said, a child's food habits begin at birth to serve or handicap him for the rest of his life. It has been estimated that between 60 to 80 per cent of well-cared-for children have to be urged to take food[1]. This amazing proportion of children with poor food habits is one of the biggest problems to be faced by all interested in child health and welfare. This method of infant feeding appears to me to be one of the fundamental steps in the right direction to the solution of this difficulty." Anna dePlanter Bowes, chief, Division of Nutrition, Pennsylvania Department of Health, posed a practical question: "Have we departed too far from the simple, common sense, matter-of-fact eating habits of children of my generation? Most of us were breast-fed, ate early from the family table, had a minimum of sweets in all forms and *enjoyed* our meals. So did our parents, for food fussing and dawdling were not common problems. The rigid-clock schedule has seemed to me to be a real contributing factor to the long, exhausting crying of so many infants and many undesirable eating habits in later childhood."

While there was general agreement regarding the advantages of the self-demand schedule, some of the questions raised indicated that further evidence was desired for the merits of the plan. Irene Waters West, dietitian, Food Clinic, Presbyterian Hospital, Columbia Medical Center, New York City, raised the following points: What number of children have been fed according to this plan? How many years were the children followed afterwards? How soon were the infants weaned from the bottle? Did it make any difference in the ease or difficulty of weaning from the bottle? How did it affect the mother's attitude towards her child's food later on? Were there more of less feeding problems later?

These are pertinent questions, some of which can only be answered by repeated observations made over a period of years.

Almost all commented that the most important problem involved in attempting to adopt such a plan would be the interpretation of this method to

[1] ALDRICH, C. A., AND ALDRICH, M. M.: Feeding Our Old Fashioned Children. New York: Macmillan Company, 1942.

allied professional groups and to the parents. Mrs. Bowes quite justifiably felt that very careful discussion and staff education prior to any work with mothers would be needed and that primiparae would have to be thoroughly grounded in the techniques outlined, including the possible benefits to themselves and their infants. She also emphasized the importance of postnatal instruction to individuals and groups at the hospital in order to make application direct, immediate, and consistent. Anna Reimer, therapeutic dietitian at University of Michigan Hospital, Ann Arbor, inserted a practical consideration: "Up to the present time, trained personnel have not been available to carry out an adequate teaching program to prepare mothers for their responsibilities during prenatal as well as postnatal periods." In the matter of proper instruction of the parents, Mrs. Caso made the interesting suggestion that "since the practice of this regime demands considerable education for the prospective mother and the development of an entirely new viewpoint for those reared in the era of regimentation of infant feeding, high school curricula might include these principles in home and family life of modern living courses. The initiation of girls and boys at this age into the psychological concepts involved in this method of infant feeding would do much toward laying the groundwork for its acceptability and making the later application seem simple and logical. For the mother at the present time who has not received such an educational conditioning, self-assuring guidance from the doctor and nurse are essential. Without this, she may encounter as many difficulties as on the rigid schedule."

The most critical comments were made regarding the omission of carbohydrate supplements from the formula. Mrs. Bowes quoted a pediatrician whose reaction was: "I have practiced for many years [the self-demand schedule]. The only thing I have not done is to omit carbohydrate from the formula of infants. I can't say that I shall begin to omit that at once." Mrs. Bowes believes that this idea may be the least quickly tried and accepted, although she says, "I thoroughly agree with the authors that many of our difficulties in teaching children to like and eat a varied diet of bland foods is rendered more difficult by too continuous and regular use of very sweet foods in infancy." She also feels that there may be a correlation between high-carbohydrate formula bottle feeding and rampant dental decay and the expensive and extensive orthodontia services so frequently needed by many children.

The omission of carbohydrate brought forth the following questions: "How will the caloric requirement be met for infants on very minimum volumes of formula? Would a very small infant with a limited capacity for fluids get enough calories without added carbohydrate supplement? Will special instructions be required to teach mothers how to increase the amount of the formula?

It is hoped that these opinions, questions, and comments will solicit responses from our readers who wish to add further criticisms, comments, and suggestions to this controversial matter.

THE NATIONAL SCHOOL FOR DIETITIANS MONTEVIDEO, URUGUAY

In seven years 104 dietitians have graduated; of these, 95 come from Argentina. Thirteen are dietitian aids. The course for physicians specializing in dietetics has graduated 103 students of whom 88 are Argentines. A total of 196 nationals have been trained in foods and nutrition.

Three of the 95 Argentine dietitians with diplomas, have left the profession to be married; of the other 92, 51 come from the provinces, and 41 from the federal capital. Twenty-seven of the provincial dietitians are employed by their local governments, 8 are in clinics and private hospitals, and the remainder are working at their profession in other posts. Of the 41 dietitians from Buenos Aires, 21 are working for the government, 4 are in clinics and private hospitals, and the remaining 16 are practicing their profession privately. Those from other countries are placed immediately in their own countries, a condition for receiving a fellowship in the School. The regulations demand that an application for admission be accompanied by a promise signed by a competent public authority making it evident that the candidate, on returning to he rcountry with the title of dietitian granted by the National Institute of Nutrition, will occupy an official post related to the purpose of her study.

In Argentina several provincial Departments of Health have created Divisions of Nutrition whose key technical personnel are the graduates of the National School for Dietitians. The work of the dietitians in university and secondary education is being generalized; there is a universal movement of primary school masters in favor of acquiring this knowledge. The medical profession, through its technical organizations and individually in private practice, continuously takes a greater interest in obtaining the technical help of the dietitian. *From Noticiario (Montevideo) 26: 1946. Translated by C. Frances MacKinnon.*

CAPTAIN PERRY AWARDED ARMY COMMENDATION RIBBON

For her outstanding service as dietary consultant with Surgeon's Office, First Service Command, Boston, Capt. Miriam E. Perry has been awarded the Army Commendation Ribbon. Presentation was made by Brig. Gen. John M. Willis, commandant, Brooke Army Medical Center.

Capt. Perry received her bachelor of science degree from Simmons College, Boston, and was graduated from the student dietitian's training course at Walter Reed Hospital, Washington, D. C.

She spent the following two years at Walter Reed Hospital; then went to the New England Medical Center, Boston, as dietitian, where she remained five years. Returning to the Army in 1938, she served as staff dietitian at Walter Reed Hospital for two years. From 1940 to February, 1944, she was head dietitian of the Military Hospital, later named the 298th Station Hospital, Puerto Rico.

She returned to Chicago as chief dietitian of Gardiner General Hospital and then spent a tour of duty as dietary consultant for Headquarters, First Service Command, Boston. She came to Brooke General Hospital, Brooke Army Medical Center, Fort Sam Houston, Texas, in June, 1946, as teaching dietitian. At present she is also serving as acting chief dietitian.

Her commendation reads: By direction of the Secretary of War, Capt. Miriam E. Perry is hereby authorized to wear the Army Commendation Ribbon for outstanding service as dietary consultant, Surgeon's Office, First Service Command, from September 19, 1945 to May 3, 1946. During this period Capt. Perry, by her untiring efforts, supervised and correlated the dietary services of the station and general hospitals of the command and improved coordination of professional activities. The services rendered by Capt. Perry were of great value to the wartime mission of the Medical Department in the First Service Command.

World's Population Inadequately Fed Even Before the War

According to the *World Food Survey*, recently released by the Food and Agricultural Organization of the United Nations, more than one half of the total population of the world normally did not get enough to eat even before the war, existing on a daily average of less than 2250 calories. In the peace years just before the war, 1935–39, half of the people were seriously undernourished, while one sixth were eating at the marginal level. Poverty was the chief reason for this widespread malnutrition, for the *Survey* shows that in all countries where the average daily supply of calories was less than 2250, the average per capita income was less than $100 per year. With few exceptions, in countries where the average supply of calories per person exceeded 2900 the average per capita income was more than $200 per year.

In general, the high-calorie areas included North America, Oceania, Russia, much of Europe, and three countries of South America. The intermediate areas included most of Southern Europe, three countries in Asia, part of the Middle East, and parts of Africa and South America. The low-calorie areas took in most of Asia, part of the Middle East, all of Central America, and probably parts of South America and Africa which have not yet been covered by the *Survey*. The daily food average varied from 3281 calories in New Zealand to 1904 calories in Korea. Countries with an average of more than 3000 calories per day were: the United States, Canada, Eire, the United Kingdom, Denmark, Norway, Sweden, Switzerland, France, Argentina, and Australia. Countries with a daily average of less than 2000 calories were: Iran, Iraq, Trans-Jordan, El Salvador, Mexico, and Columbia.

In countries with the highest average calorie levels, the consumption of cereals in relation to that of other foods was relatively low—about 1000 calories daily—and meat and milk consumption was comparatively high, supplying about 50 gm. of animal protein. In contrast, in countries where average total calorie consumption was low—about 2000 or less—a high proportion of total calories was obtained from cheap foods rich in carbohydrates, such as cereals. With few exceptions, the average calorie value from cereals in such countries was never substantially below 1000. Thus, in the two extremes, approximately 33⅓ and 50 per cent of the total calories were obtained from cereals.

The target at which the FAO aims is an average of 2600 calories per person per day the world over. To raise the standards to meet this goal, countries with low prewar calorie intake will need greatly increased supplies of cereals, fats, legumes, fruits and vegetables, milk, fish, and eggs.

Concerning goals of individual foods, the following recommendations were made: from 1200 to 1800 calories daily from cereals; an intake of 100 to 200 calories from starchy roots and tubers and starchy fruits; 10 to 15 per cent of total calories from sugar; at least 100, and preferably 150–200 calories from fats; pulses (where they are important foods), 250–300 calories per day; 100 calories from fruits and vegetables; not less than 100 and preferably 120–200 calories from meat, including poultry, fish, and eggs; an intake of 300–400 calories per day of milk and milk products.

It is also estimated that world food production must be increased by 1960 by the following percentages, if the world population increases as predicted: cereals for human consumption, 21 per cent; roots and tubers, 27 per cent; sugar, 12 per cent; fats, 34 per cent; legumes, 80 per cent; fruits and vegetables, 163 per cent; meat, 46 per cent; and milk, 100 per cent. The greater part of these additional food supplies will, in most cases, have to be obtained domestically, rather than by importing from areas with surplus food supplies.

Current Comment

FAMINE EMERGENCY CALLS FOR APPLICATION OF NEWER NUTRITION TRENDS[1]

FLORENCE I. SCOULAR

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One of the major considerations of the Famine Emergency Committee will be with the recent developments in the field of amino acids and proteins. The need for more protein foods for human consumption has received little notice in the United States for ample amounts have always been provided. However, these foods have not been equitably distributed. Just as the food source of protein consumed varies in different countries so our protein foods vary in consumption. For instance, numerous studies show that not only is the protein of the southern diet furnished largely by vegetables but that the total consumed is lower than that of the northern states. Dietary studies of college women of the South indicate that their lower basals are related to their preference for vegetable proteins. Also, the people of Europe who have been vegetarians for generations have a lower basal metabolic rate than those who eat flesh.

The superiority of animal protein due to the larger number and greater quantity of essential amino acids present, has been established. The biological value of proteins is obtained by observing the number of grams an animal gains per gram of protein fed and/or the ability of a given protein to maintain nitrogen equilibrium. The most recent investigation (1) indicates that the biological value of a protein is related to its coefficient of digestibility. The authors found that the difference in the biological value of soy beans, oats, milk, and other proteins was accounted for by the rate at which the individual amino acids were released during enzymatic digestion. The authors emphasize, however, the need for caution before rating a sample with a high coefficient of digestibility as the most acceptable, since excessive heat treatment of soybean meal which destroyed certain amino acids also improved the completeness of digestion through a greater retention of the absorbed nitrogen.

[1] Received for publication June 20, 1946.

The coefficient of digestibility of protein food, as well as of all foodstuffs, is of special interest today when so many people in the world are starving. A value of 92 was usually assumed for animal protein while the values for vegetable protein varied greatly. Adolph (2) gives the coefficient of digestibility of the typical Oriental vegetarian diet as ranging from 55 to 80 with an average of 65. The problem of the digestibility of protein foods is then not only one of interest to us for better nutrition in the United States, but for better nutrition of all peoples.

That we have overlooked a very excellent source of high quality protein for human consumption is evident from the work of Deuel and others (3) who studied the nutritive value of fish proteins. Only a small proportion of the total available fish catch is at present used for human food as fresh, dried, or canned products. The biological value of mackerel, tuna, and sardines were compared with casein. The mixed proteins of each fish gave considerably more rapid growth of weanling rats than diets containing similar amounts of casein. Furthermore, mackerel proteins gave more rapid hemoglobin regeneration than casein in rats made hypoproteinemic and was equal to casein in causing regeneration of plasma proteins. Allison and others (4, 5) showed that the regeneration of plasma protein increased in magnitude as the nitrogen balance increased on the positive side. A generalization might be appropriate here: an increase in the nitrogen balance means an increase in plasma proteins of the same magnitude.

The use of protein hydrolysates and amino acid therapy in starvation, post-operative cases, hepatic diseases, ulcers, and many other diseases have given spectacular results. The work of Melnick and coworkers (1) suggests that it is not only necessary to furnish a proper balance of the essential amino acids but that certain peptide linkages must be assured for the satisfactory utilization of amino acid nitrogen.

With the increased need of protein foods for both human and animal consumption there has been an added incentive to make use of waste substances or by-products. Yeast (6) was the one to receive first attention. When yeast is fed as the sole source of protein at levels as high as 13 per cent crude protein, it supplies an inadequate amount of methionine for optimum growth of the young rat. This inadequacy can be corrected by the addition of methionine

or methionine-rich protein but is only partially corrected by cystine. There is evidence that cannery wastes can be used for the production of yeast for use in feeds without affecting the nutritional value of the protein. Dried brewers' yeast added to food prepared for humans not only increases the quantity of vitamin B-complex of the diet, but adds measurable amounts of protein.

Consideration is now being given to tobacco-seed oilmeal (7) as a supplement to dietary protein of rats. The biological value of tobacco-seed oilmeal protein and of the protein of skim milk powder are 51.4 and 78.5, respectively. This protein is deficient in lysine. Supplements of casein, lactalbumin, skim milk powder, or lysine result in good growth. However, the desire for seeds yielding high oil contents excludes them as a potential source of protein.

The biological method of determining the quality of food proteins is very slow. Consequently, an attempt is being made to find better chemical means of estimating the nutritive value of vegetable proteins. At present the results of Evans and St. John (8) indicate that the chemical quality protein index method of Almquist, Stokstad, and Halbrook may be used in evaluating vegetable protein concentrates if the products are not overcooked. It is not a satisfactory method of evaluating differences in the supplementary nutritive value of soybean oilmeals, and it is hoped that an accurate and satisfactory chemical method may soon be developed.

With a shortage in the food supply of the world, there is some satisfaction in knowing that body nitrogen is used more efficiently when the caloric intake is reduced. However, the fact that the utilization of dietary nitrogen is not altered puts further demands on us to supply an adequate intake of protein as well as of calories. In Great Britain during the war improved nutrition was observed when the people received fully one half of their protein from animal tissues or animal products.

Ironically, many of the seeds which are a source of vegetable protein in the human diet also provide the richest sources of vegetable oils. Vegetable oils are in greater demand than butter for shipping to famine areas due to their cheapness. One gm. of fat furnishes 2¼ times as many calories as 1 gm. of pure carbohydrate, such as starch or sugar. Consequently, the effect of fat in the diet upon food utilization is of particular importance at this time.

The Institute of Animal Nutrition at Pennsylvania State College has undertaken studies (9) to determine the effect on rats of varying amounts of fat upon digestion, nitrogen retention, energy, and growth. Isocaloric diets containing 2, 5, 10, and 30 per cent fat were fed the rats. The gains in live weight, the digestibility of nitrogen, and the retention of nitrogen and energy increased with an increase in fat in the diet. The superiority of the 5 per cent fat diet over the 2 per cent was greater than the superiority of the 30 per cent diet over the 5 per cent diet. Nevertheless, the digestibility and the retention of food nitrogen were highest on the diet containing 30 per cent. The decreasing energy expense of utilization of the isocaloric diets was in the order of their increasing fat content; the decrease in heat resulted from the catabolism of carbohydrate and from fat synthesis. The desirability of furnishing fat for the Famine Emergency Program is evident from this study since it promotes more efficient use of nitrogen.

The desirability of sending the vegetable oils which are cheaper is also based upon the evidence that diets containing these oils are as effective as those containing butter in promoting growth and are as efficiently transformed to body tissue as similar diets containing butter for the fat. Deuel, *et al.* (10) were unable to show a difference in growth when 21-day weanling rats were fed lactose at the level found in milk as the sole source of carbohydrate. They added butter, oleomargarine, corn, cottonseed, olive, peanut, or soybean oil to mineralized skim milk powder which was fortified with vitamins A, D, and E. It was found that rats prefer a butter diet or one flavored with diacetyl or commercial butter flavor. When *ad libitum* feeding is used, this no doubt accounts for the greater gain in weight of the rats on the butter diets because they eat more food (11). The age of weaning seems to have little effect upon the animals' gain in weight; no difference was noted when the vegetable oils were used in diets beginning as early as seven days after birth.

The suggestion that butter fat may contain some long chain saturated fatty acids which were not found in the vegetable oils does not seem to be the case. Henderson and co-workers (12) used fat-free diets to which were added milk fat, triolein, trilaurin, and a combination of triolein and trilaurin and obtained as good growth with triolein as with milk fat. Trilaurin was inferior for growth, a combination of triolein and trilaurin produced growth which was intermediate to the trilaurin and triolein.

The length of the fatty acid chain may be associated with the production of fatty livers when the diet is deficient in choline. Stetten and Salcedo (13) fed the ethyl esters of the homologous series of even-numbered fatty acids from butyric to stearic to young rats on a choline-deficient diet. The degree of fatty liver was found to increase markedly with a decrease in the fatty acid chain to 14 carbons. No severe liver damage was observed when ethyl esters of fatty acids of less than 12 carbons were fed. Whether or not a situation comparable to these animal experiments could exist and be responsible for fatty livers in humans is questionable.

These findings and many other new trends in nutrition are particularly timely for they emphasize the need to save food and to make the most of what we use.

REFERENCES

(1) MELNICK, D., OSER, B. L., AND WEISS, S.: Rate of enzymic digestion of proteins as a factor in nutrition. Science 103: 326, 1946.
(2) ADOLPH, W. H.: The protein problem in China. Science 100: 1, 1944.
(3) DEUEL, H. J., HRUBETZ, M. C., JOHNSON, C. H., WINZLER, R. J., GEIGER, E., AND SCHNAKENBERG, G.: Studies on the nutritive value of fish proteins. I. Evaluation by the rat method and by the Cannon method. J. Nutrition 31: 175, 1946.
(4) ALLISON, J. B., AND ANDERSON, J. A.: The relation between absorbed nitrogen, nitrogen balance and biological value of proteins in adult dogs. J. Nutrition 29: 413, 1945.
(5) ALLISON, J. B., SEELEY, R. D., BROWN, J. H., AND ANDERSON, J. A.: The evaluation of proteins in hypoproteinemic dogs. J. Nutrition 31: 237, 1946.
(6) KLOSE, A. A., AND FEVOLD, H. L.: Nutritional value of yeast protein to the rat and the chick. J. Nutrition 29: 421, 1945.
(7) RAPP, K. E., SKINNER, J. T., AND MCHARGUE, J. S.: The nutritive value of the protein in the tobacco-seed oilmeal. J. Nutrition 31: 261, 1946.
(8) EVANS, R. J., AND ST. JOHN, J. L.: Estimation of the relative value of vegetable proteins by two chemical methods. J. Nutrition 30: 209, 1945.
(9) FORBES, E. B., SWIFT, R. W., ELLIOTT, R. F., AND JAMES, W. H.: Relation of fat to economy of food utilization. I. By the growing albino rat. J. Nutrition 31: 203, 1946. II. By the mature albino rat. 31: 213, 1946.
(10) DEUEL, H. J., JR., AND MOVITT, E.: Studies on the comparative nutritive values of fats. V. The growth rate and efficiency of conversion of various diets to tissue in rats weaned at 14 days. J. Nutrition 29: 237, 1945.
(11) PARRISH, D. B., SCHIMER, R., AND HUGHES, J. S.: Growth of food preference of rats fed a lactose-dried milk ration containing butter fat or corn oil. J. Nutrition 31: 321, 1946.
(12) HENDERSON, J. L., JACK, E. L., LEPKOVSKY, S., AND REID, D. F.: The growth of young rats fed milk fat and certain synthetic glycerides as supplements to a fat-free diet. J. Nutrition 30: 169, 1945.
(13) STETTEN, D., JR., AND SALCEDO, J., JR.: The effect of chain length of the dietary fatty acid upon the fatty liver of chlorine deficiency. J. Nutrition 29: 167, 1945.

MENU PLANNING AND FOOD HABITS[1]

DOROTHY DICKINS

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Food habits are transmitted by tradition, that is from one generation to the next. These habits are, therefore, tied up with associations of the past as well as of the present. It is important for menu planners to know something about the food habits of the group they feed.

One method of studying food habits is to obtain menus served in families similar to those from which patients or students come, and to correlate the information thus obtained with menu planning. The menu approach to understanding food habits is of value because:

(a) Menus give some indication of the method of food preparation used.
(b) Menus show what foods are eaten together. Foods are eaten in combination with other foods in culturally determined clusters.
(c) Family menus represent family preferences.

Since foods are prepared by particular recipes and since menus give an indication as to the recipes used, menus are of assistance in understanding food habits. For example, macaroni and cheese and macaroni with tomato sauce are more meaningful than just macaroni. One may not, for example, eat carrots in their natural state. One may eat carrot strips, carrot and raisin salad, or boiled carrots seasoned with butter or margarine. Apples may be consumed as baked apples, apple sauce, fried apples, apple salad, and other ways.

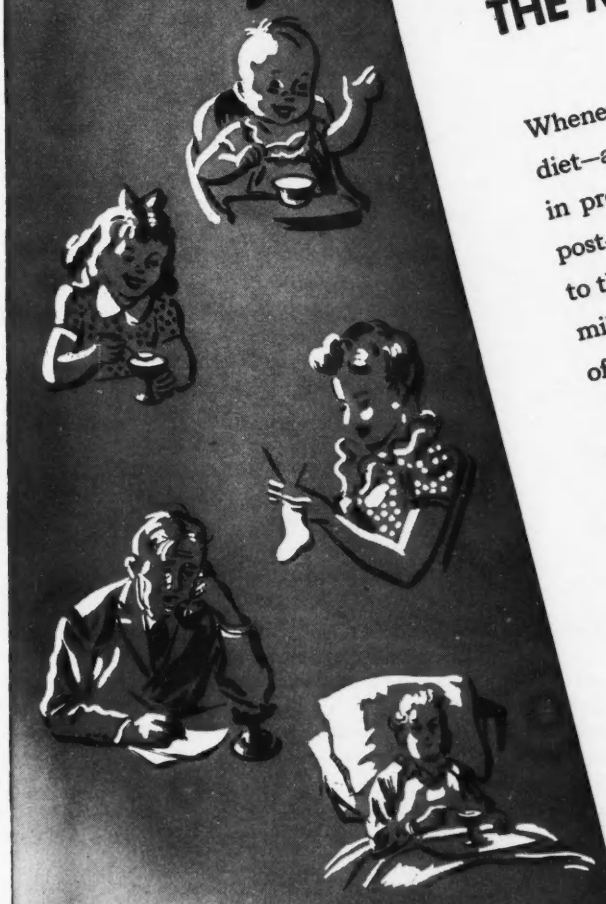
Menus are valuable in understanding food habits not only because they give a picture of foods to which the group are accustomed, but because foods are eaten in combination with other foods in culturally determined clusters. One of the first things a young southern-reared hospital dietitian in New England noticed about the menus served was the frequent use of Irish potatoes. They were served at every dinner and sometimes at supper. After several weeks, she decided to substitute candied sweet potatoes for the usual baked or mashed Irish potatoes at dinner. Broiled steak was the meat served that day. About 10 min. after the food had left the kitchen, the telephone began ringing: "Where are the potatoes?" "Send the potatoes!" A pot of cold mashed potatoes left from supper the night before was hurriedly heated, divided, and sent around to wards where there were most complaints. After this episode she never served beef and sweet potatoes again at noon to these New Englanders.

Recent studies provide illustrations of the principle that foods are eaten in combination with other foods in cultural patterns. Dickins (1) obtained data from 1404 white and Negro children in 12 junior high schools in Mississippi concerning effects of the white cornmeal shortage on the consumption of cornbread and other foods. The study was made during the winter following the 1943 summer and early fall shortage. Yellow cornmeal was available in many places when white cornmeal was scarce. However, cornbread prepared with yellow cornmeal differs in texture and flavor from that prepared from the white cornmeal.

[1] Contribution fro tmhe Department of Home Economics, Mississippi Agricultural Experiment Station, State College, Mississippi. Published with the approval of the director. Paper No. 118, New Series, June 3, 1946. A revision of a paper given at the Alabama Dietetic Association meeting, February 7, 1946. Received for publication July 22, 1946.

Tempting

THE MILK-JADED PALATE



Whenever milk is an important "must" in the diet—as throughout infancy and childhood, in pregnancy, gastrointestinal and post-operative conditions, etc.—appealing to the eye and palate by "dressing up" milk is frequently the only means of insuring an adequate intake.

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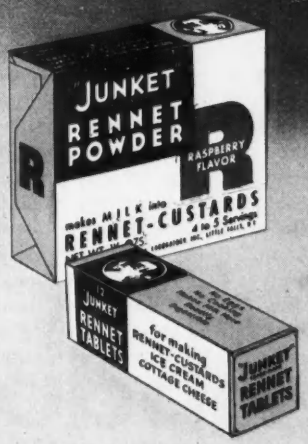

To assist in your pediatric diet problems, four highly authoritative Infants' and Children's diet lists are available—at no cost or obligation. "Personalized" with your name, address and phone number, physicians find them comprehensive, flexible and time-saving. May we send samples?

About 60 per cent of the white and 80 per cent of the Negro children reported that their families had not been able to find white cornmeal on the market during the summer and fall of 1943. Families of 12 per cent of the white and 8 per cent of the Negro children, consequently served no cornbread at all; families of 44 per cent of the white and 62 per cent of the Negro children made cornbread only a few times, using yellow meal; the families of 44 per cent of the white and 30 per cent of the Negro children made cornbread as usual, using yellow meal. Green vegetables, peas, beans, and buttermilk were the foods eaten less often than usual during the cornmeal shortage.

The same principle can be illustrated at the professional level. A French woman who received her master's degree in institutional management at one of our leading universities recently complained about one of her teachers: "Miss X wanted us always to think up new combinations of food. We could not serve peas with lamb chops because we had served them with leg of lamb two weeks before. Peas make lamb taste better and lamb makes peas taste better. Every Frenchman knows that. Why serve lamb chops and spinach when lamb chops and spinach do not go together?" I am not, of course, suggesting that the same combinations always be used. However, combinations do affect consumption not only of the particular food, but of foods served with it. Have you ever made a study of preferred combinations in the group you feed?

In connection with a study of food preparation in small town families of Mississippi, 160 homemakers kept records of foods served in their families during one week in July or August. These families included four racial socioeconomic groups of about 40 families each, divided equally between white and Negro. Group 1 included white families with monthly rent expenditures (or rental values) of $20 and under; Group 2, white families with monthly rent expenditures (or rental values) of $20.01 to $40; Group 3, Negro families with monthly rent expenditures (or rental value) of $7.50 and under; Group 4, Negro families with monthly rent expenditures (or rental value) of $7.51 to $20.

Boiled field peas (cowpeas) were served one or more times at dinner by 75 to 100 per cent of the white families in Group 1 and as often by the same proportion of Negro families in both housing groups. Boiled peas were served at dinner once or more by 50 to 74 per cent of Group 2 families. Field peas were served at 22 per cent of the 1120 dinner meals. Cornbread was served at 72 per cent of the 1120 dinner meals, but at 98 per cent of the dinner meals in which field peas were served.

The use at breakfast of jelly or preserves, or sirup with biscuit and with toast, is also indicative. Biscuits were served at breakfast during the report week once or more by 75 to 100 per cent of the families in each of the four groups. Toast was served one or more times by 75 to 100 per cent of the families in Groups 1 and 2, by 25 to 49 per cent of the families in Group 3, and by 50 to 74 per cent in Group 4. The combination of jelly and toast was served at 11 per cent of the breakfasts. The combination of biscuit and cane sirup appeared at 13 per cent of the breakfasts, but toast and cane sirup at only 1 per cent. In the study made during the cornmeal shortage, children were asked if there were any foods they would not eat at all if there were no biscuits. Cane sirup and gravy were the two most often mentioned. Toast and sirup is evidently not a customary combination.

The assumption that the menu is the best basis for understanding food habits has another basis. Families like what they eat. Preferences are the result of food availability, climate, geographical conditions, and technological development.

People like what they eat according to Lewin (2) who states: "Our data do not give support to the widely prevalent idea that favorites are generally those foods which are difficult to obtain. People like what they eat rather than eat what they like." The Mississippi summer menus of Negro families showed the use of fairly large quantities of turnip greens, collards, and cabbage even though these vegetables were not in season and at their best eating stage. These vegetables are easily grown and cheap, and are therefore eaten in large amounts by low income southern people, especially by Negro families. Because they are liked, these greens are eaten in large quantities. In fact, they are sought even when not at the best eating stage.

Dickins (3) likewise suggested that people like what they eat. In one study only 5 per cent of the new foods tried during the report year by 1158 small town families of Mississippi received fair or poor family reaction. In other words, new foods that family members do not like do not ordinarily appear on the table, nor are new foods tried unless the homemaker is fairly sure the family will like them.

Menus kept by Mississippi homemakers repeatedly show that food likes result from habits, and that habits result from food availability, climate, and technological development. The frequent use of biscuit, already mentioned, is one example. Biscuit was found to be a prominent breakfast dish of Mississippi families, for male heads and homemakers in most of these families had been reared on Mississippi farms. They had had biscuit for breakfast when they were children. Making yeast bread has never become established in the South, since a warm moist climate causes bread to mold easily. Good baker's bread was formerly not easily obtainable. Now that it is, many families are shifting to toast for breakfast.

Boiled butter beans (small Lima beans) and field peas were two vegetables used by the large majority of Mississippi families during the study week. These

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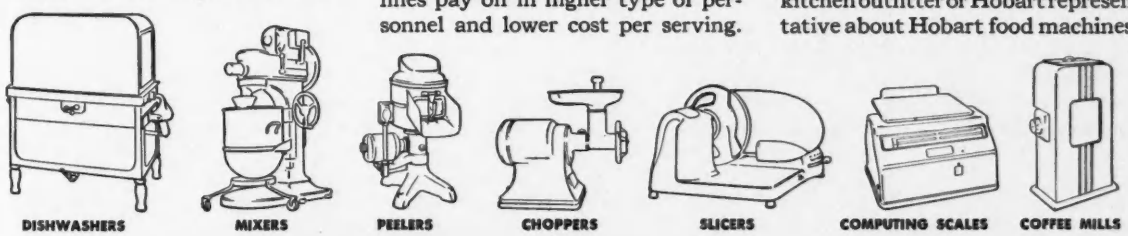

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vegetables grew well in the South, hence are generally available, are eaten and liked. Fresh field peas and butter beans are considered even more palatable than the dried and are, therefore, put in cold storage lockers in large quantities. The usual method of cooking these legumes is to boil them, using salt pork or bacon drippings as seasoning. Butter beans, however, are seasoned with butter or margarine by a number of homemakers. This is rarely the case with field peas.

The use of pork fat in seasoning vegetables is a recipe in the South that has been passed from mother to daughter. Milk and butter were formerly not used, partially because of the difficulty of keeping them sweet in hot weather. Salt pork, cured pork, and lard had good keeping qualities, were always available, and, therefore, were used for seasoning.

The most important summer dinner meat on the menus of the Mississippi families was fried chicken. This is traditional with southern, rural-reared people, since chicken is easily produced and can be killed shortly before frying. Then, too, fryers are ordinarily in season when fresh pork is not available. Since pork is produced in quantity, lard is available for frying.

A study of typical menus of families similar to the group you feed will provide a good basis for understanding local habits because menus give a picture of foods served, because foods are eaten in combination with other foods, and because menus served represent what families and, in turn, individuals like. This may be called the menu approach to the study of food habits. The menu approach to the dietitian means studying complete dietaries during two-, three-, or seven-day periods throughout the year of families typical of those from which her students or patients come. It is important to know what those you must feed regard as breakfast dishes, lunch or supper dishes, and dinner dishes. A record of company meals, birthday dinners, and holiday dinners is an important part of this menu approach, as is a record of foods eaten between meals. All this is particularly important to the dietitian who comes from another region.

Some information concerning home menus of the group one feeds is available to most dietitians. For example, diet records obtained by the out-patient department of the hospital contains information concerning home menus. Dietary studies made by state and government agencies sometimes give this information, though not always. Their main concern has been with nutrients rather than with dishes and combinations of dishes served. College nutrition departments could render valuable service to dietitians by collecting, analyzing, and bringing menu information to their attention. It is important that the schedules used in this connection be set up so that the data on food preparation, between-meal eating, and the like be obtained.

The menu approach is especially important in showing desires of lower socioeconomic status families for foods of a higher social level. For example, 25 to 49 per cent of Groups 1, 3, and 4 served sandwiches for supper once or more during the report week. From 50 to 74 per cent of the families of Group 2 served them as often. Tomato sandwiches were most frequently used in all groups. Thus it would seem that sandwiches are a supper dish that meets the general acceptance of a group with a Mississippi small town background.

The frequency with which fried eggs were served for breakfast was also noted. They were served once or more during the study week by 50 to 74 per cent of the white families, and as often by families in Group 4. Twenty-five to 49 per cent of the families in Group 3 served them as often. In other words, fried eggs were an acceptable breakfast food.

Dietitians cannot and should not, however, limit themselves altogether to the familiar. New foods, new combinations, and new methods need to be introduced into the menu. New dishes or recipes may be of three general types:

(a) A new combination of familiar foods—for example, if grapefruit has been used only as a breakfast fruit and is served for the first time in the form of salad, a new combination of familiar foods would be served.

(b) A new method of preparing a familiar food—for example, steamed mustard greens might be served when formerly they had been served boiled.

(c) A new food—if broccoli had never appeared on the table in any form, buttered broccoli would be regarded as a new recipe of this third type.

It was shown in the Mississippi food preparation study already referred to (3) that the first two types of new dishes are more likely to receive favorable reaction than the third type. A new menu that includes a dish which is both a new food and a new combination of familiar foods will be even less favorably received—as for example, creamed salmon with mushrooms to a group who had never tasted mushrooms and who had eaten salmon previously either as it came from the can or made into patties is likely to be unpopular.

It would seem that one of the best methods of achieving acceptance of foods not previously served is to avoid mixtures. If it is necessary to introduce a new food, introduce it alone. In other words, if summer squash had not previously been served, it would be more acceptable boiled until tender and flavored with familiar seasoning, such as bacon drippings, butter, or margarine. It would be unwise to introduce it in the form of a scalloped dish with bread crumbs, white sauce, and cheese.

One way to persuade homemakers to try new foods is through the use of friends. In the Mississippi food preparation study, the influence of friends was found to be the most important factor in inducing home-

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makers to try something new. The source of suggestion for about 30 per cent of the new foods tried was a friend. Leaders in an institution might, therefore, be an effective means of achieving greater food acceptance. A group of popular, friendly, understanding nurses in the hospital, or teachers and students in schools and colleges might well be used. An advisory council composed of such people might help interpret what you are trying to do, thus helping you do a more effective job.

Required courses in foods for all students in elementary and secondary schools and in colleges for men as well as for women would also be helpful. The Mississippi study showed that men and boys are an important factor in long-run change in food preparation, though women and girls much more frequently suggest new dishes actually tried in the home.

The factor which tends to slow up change in food habits, especially in lower socioeconomic levels, is the influence of traditional food preparation rules, or rules passed from mother to daughter. One study (4) of 1500 such rules showed that 52 per cent of the 698 white homemakers and 84 per cent of the 460 Negro homemakers had been taught one or more rules in food preparation by their mothers or someone else in the parental home.

In preparation of food in institutions, traditional food preparation rules may be more important to the cooks than written or oral instructions by the dietitian. Institutional kitchens employ people, most of whom knew something about cookery before they entered the kitchen. How to insure that instructions are followed without providing constant supervision is a problem.

Dietitians also need to know something about the surroundings under which the groups they feed are accustomed to eating. Often it is not the food, but the surroundings that are the actual cause of food complaints. Satisfactory surroundings may mean separate dishes for foods containing excess liquid, shiny silver, less noise, fewer people at the table.

SUMMARY

Food habits are the concern of every dietitian and are at the root of many complaints about food. Therefore, dietitians might well profit by studying food habits of the group they serve. One method is to study typical local menus. This is a good method of understanding food habits because:

(a) Menus are a record of the form in which food is consumed.
(b) Foods are eaten in combination with other foods in culturally determined clusters.
(c) Menus represent what family members like, for family members like what they eat.

Food attitudes are the results of food habits, and food habits are the results of food availability, climate, geographical conditions, and technological developments.

College food and nutrition departments could render valuable service to dietitians by obtaining, analyzing, and making available such data.

The dietitian must not only know food habits of the group she feeds, but teach new food habits. From studies made in Mississippi, it would seem better acceptance of foods not served previously may be obtained by (a) avoiding mixtures; (b) using familiar seasonings; (c) using local leaders as propaganda channels.

An important factor in retarding change in food habits found in the Mississippi studies was the stabilizing influence, particularly at lower socioeconomic levels, of cultural traditional food preparation rules. It is suggested that in preparing foods in institutions, traditional cultural rules may be more important to the cooks than written instructions.

Surroundings under which foods are consumed also affect food habits.

REFERENCES

(1) DICKINS, D.: Some effects of a white corn meal shortage. J. Am. Dietet. A. 21: 287, 1945.
(2) Forces Behind Food Habits and Methods of Change. The Problem of Changing Food Habits. National Research Council Bulletin No. 108, 1943.
(3) DICKINS, D.: Changing pattern of food preparation of small town families in Mississippi. Mississippi Agric. Exper. Sta. Bull. 415, 1945.
(4) DICKINS, D.: Traditional food preparation rules. Mississippi Agric. Exper. Sta. Bull. 418, 1945.

TRENDS IN FOOD STANDARDS[1]

CONSTANCE C. HART

Director of School Lunchrooms, Board of Education, Rochester, New York

Food standards embody a consideration of budgetary allowances, menu planning, sanitation, methods of food preparation, and the training of employees for the maintenance of high standards.

Every manager must have full cognizance of her financial responsibilities before establishing food standards. She must know the proportions she can spend for food—whether 60, 40, or 30 per cent—labor, cleaning supplies, new equipment, replacements, and rent. Obviously, the type of food served will be dependent upon the budget.

With a clear understanding of the budgetary outlook, the manager can intelligently construct the weekly menu. Menu planning entails a consideration of various factors: length of lunch period, repetition of foods, evaluation of nutritive needs, efficiency in food purchasing, the institution's facilities, equipment, and employees.

By planning menus a week in advance, the manager obtains an overall picture of the food to be purchased and is able to meet more accurately the

[1] Presented at the New England Conference on Organization and Management, Boston, June 8, 1946.

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nutritional needs of her patrons, to buy efficiently, and to avoid repetition in the same week.

It is wise to check the menus for preceding weeks to avoid repetition. After three weeks, some items can be repeated, for most people do not remember a menu after that time. Obviously, however, the same thing should never be served on the same day of the following week.

There are many ways to vary the menu simply by varying the way one food is prepared. Carrots may be served in circles, julienne, diced, browned, combined with other vegetables, or glazed (although at present the sugar situation prevents this method of preparation). Cabbage may be chopped fine with the center removed; or it may be cut in thin slivers or wedges, the wedges being of uniform weight. Beets may be cut or diced, served hot with a savory sauce, served cold with chopped celery, or just buttered. Vegetables may be creamed if the sauce is of an even consistency.

Many variations of the tossed salad can be made with thin strips of American or Swiss cheese, thin slices of chicken, ham, veal, bologna, sausage, or balls of cream cheese rolled in finely chopped parsley and tossed into the salad at the last minute. Water cress, endive, carrots, radishes, turnips, celery, cucumbers, small flowerettes of cauliflower, carefully washed broccoli, cabbage, and a host of other greens may be included to add interest and variety.

Knowledge of the foods patrons usually eat at home is helpful in planning menus. Some of these foods may be included in the bill of fare, and if there is a nutritional deficiency in the home dietary, the manager can offer those foods which are lacking when she plans her menus. If a new food is to be introduced, it will be more successful if served on a plate lunch in combination with popular foods.

Combination salad and sandwich plates are usually popular with women, and often with men. In the spring, crisp salad plates are a change from the heavier winter foods. Salads can be sold at different prices—small salads sold for a few cents will encourage people to buy a salad with a hot dish, or salad may be offered as a substitute for a vegetable on hot plates.

The texture and color of food as it will appear on the plate or counter should also be considered at planning time. In selecting vegetables, for instance, greens and whites, greens and yellows, greens and reds, different shades of green are all good combinations, but beets and carrots or beets and tomatoes should never be placed next to one another. They should be separated by green and white vegetables.

Other important factors to consider in planning the menus are the amount of oven and top-stove space and the efficiency of the equipment. Employees cannot be expected to prepare attractive fruit cups and salads unless the equipment is in good condition. Slicing machine knives, paring knives, and so on, should have keen edges and should be of the right shape for the particular operation for which they are intended.

After the manager has planned the menus, the next step is purchasing. To satisfy the patrons and give them as much as possible for their money, she must know food costs. Popular inexpensive foods must be planned for some days in order to balance expenditures for expensive items on others. Usually the choice grade of canned vegetables is satisfactory for institutional buying, while standard grade may meet requirements in some places. As a general rule, the choice grade costs a little more, but the product will have a more attractive appearance and a finer flavor.

Many managers today are using frozen foods; some brands are satisfactory and others are not. It is hoped that there will be some standards for frozen foods set soon. A great deal of experimentation is being carried on in this field and in the future more and more frozen foods will probably be used. Many packers are planning to bone meats, package them for both retail and wholesale use, and ship directly to institutions. Some think the price will be high. However, although the initial cost may be higher, the waste will be eliminated, and it is possible that the processor may be able to defray some of the additional cost by using the bones in by-products. There is also a time-saving element in the institution itself which may offset part or all of the higher cost.

Fresh fruits and vegetables are customarily bought daily or two or three times a week. The institution buyer must decide what sizes are best suited to her organization's needs. Much care must be exerted after these fruits and vegetables are received to see that they are properly handled and stored. Profits can evaporate quickly when a crate of oranges or a bushel of apples is allowed to stand with one spoiled piece in the lot.

The manager should know the grades and cuts of meat and be able to recognize good meat. No one wants chuck beef for stew which is mixed with about one third shank.

Economy of operation and maintenance of standards are also dependent upon the type of employees and the training given them. For instance, the range cook should be taught the proper temperature for cooking the various cuts and kinds of meats and instructed on serving procedure. Roast meat, for instance, will cut to better advantage if it is allowed to cool a short time after removal from the oven. Meat cut immediately after coming from the oven will break and will not yield as many servings, which is an important factor if the food margin is close.

Just a word about sanitation: no food can be attractive served on a counter, on plates, or from kettles that are not spotless. Standards of food preparation are inadequate without good standards of sanitation.

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Care in preparation cannot be stressed too much. The cutting of vegetables is important. Strips of carrots should be even so that, if they are to be cooked, they will be done at the same time. It is easier to cut the strips before they have been crisped.

Cooking methods, too, are of utmost importance. Cooks must realize that cooking vegetables in as small an amount of water as practical or by steaming produces a better looking and more nutritious food. Vegetables should be cooked in small quantities and brought to the serving counter often. Shallow serving pans are advisable for in deep pans the weight of the vegetables on the top crushes those underneath.

Standards of service are not necessarily dependent upon the money available. Perhaps it *is* impossible to serve lobster, broiled white fish, or filet mignon, but it *is* possible to serve perfect beef stew. Employees can be taught to cut potatoes in even sizes, carrots in even strips. The pieces of meat should be cut to uniform size so that they will all cook evenly. If there are to be fluffy mashed potatoes on top, they should be the right consistency; or if it is to be beef stew with baking powder biscuits, they should be a golden brown, perfectly shaped, of even thickness, and carefully put on top of each serving. If the peas or beans are put in too soon, the vegetables will lose their crispness. Often, frozen or fresh peas carefully cooked in water and drained are very attractive sprinkled over the top of the stew.

At one time, lettuce, tomato, and cucumber salads seemed to be the only salads served other than fish or chicken salads; then elaborate salads, such as candle and butterfly salads, appeared. Today tossed green salads are popular. How delicious they are when well made, but what limp apologies they can be if the vegetables are "tired." Employees should understand that all ingredients in the salad should be crisp, fresh, cold, well cut, thoroughly clean, and of contrasting colors or shades. The vegetables should be cut in easily eaten, fork-sized pieces.

A little garlic, allspice, or herbs in the French dressing makes a flavorful dressing for the green salads that is a little different. However, if the dressing is added ahead of time, the salad wilts.

For fruit salads small pieces of the inside of the lettuce may be placed in the lettuce cup for a nest to build up the salad, with the fruit on top. This makes the salad appear much larger and allows the purchaser to see almost every piece of fruit.

If the salad is supposed to be served on cup-shaped lettuce, the main rib should not be broken. It is so easy to separate lettuce, and with a little care, to have perfect cups. The salad maker must be taught how to take care of greens so as not to bruise them. She must have or develop a light touch.

If a garnish is used on a salad, it should be on the side or in the same position on all salads served that day. The garnish should be the finishing touch. Maraschino cherries, if cut very thin, are attractive touches on some salads, but a whole cherry in the center is too much. Endive and water cress are effective garnishes, especially when tucked next to yellow or orange fruits or vegetables.

The simpler the garnish, as a general rule, the more attractive it is. Water cress, tomato wedges, radish roses, carrots cut in curls or strips, endive, circles of green pepper, celery curls, thinly sliced fruit, all add interest and give added food value.

Fruit for fruit cups must be cut just as carefully as for salads. Most canned fruit cocktails are unattractive, but the addition of whole orange or grapefruit sections, a few white grapes, or fresh strawberries will give interest. If a small amount of grated lemon rind and juice are added to a simple sirup or the fruit juice poured over the chilled fruit and allowed to stand an hour or so in the refrigerator, added flavor and zest is achieved. Sometimes, a few after-dinner mints allowed to stand in the fruit cup give a different flavor.

Open-faced pies may mean the use of meringues. The meringue, when put on the pie, should touch the metal on the pan, so that it will not pull away from the edges. Enough sugar should be added when the eggs are beaten so that the meringue will stand up and be fluffy rather than watery. The pie should be cut with a knife dipped in water. The same thing is true with cutting cakes. To conserve sugar, most lunchrooms today are making loaf rather than layer cakes. The cakes should be cut in uniform-sized pieces.

Because of the present personnel problem, many dietitians may say that achieving these standards today is well-nigh impossible. During the depression employees were willing to attend training classes after work and showed keen interest in their jobs. The last few years, we have had to employ less capable people who usually are unwilling to put in extra time, even when paid overtime rates. Thus all training must be done on the job and employees available today must be trained to be as efficient as possible.

In the Rochester school system it was decided a year ago to start a food preparation analysis project to see if waste motions could be eliminated and employees trained to work more efficiently. We started with a small committee of managers. Gradually all the managers were drawn into this study group. We wanted to teach employees to save steps and motions, to analyze the job in order to develop speed with as little effort as possible, and to turn out the best product possible. They, in turn, would derive satisfaction from doing a job well.

Groups of managers chose different stations to analyze. One group took sandwiches, another rolls, another coffee making, and still another preparation of vegetables. Each manager worked with the employee in her group who was performing that particular operation. The operation was analyzed from

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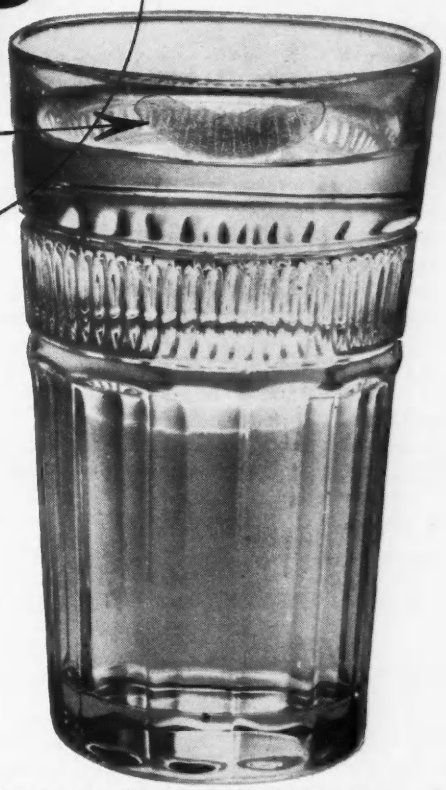

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the standpoint of equipment, material needed, and the procedure. Directions were made as simple as possible following a uniform outline. As the manager worked with her employees, she not only assisted the workers, but she also analyzed the whole operation.

The committee went over the first outline step by step and after it had been corrected, one member presented it in demonstration form to all the managers. Copies of the analysis were prepared beforehand and distributed so that the managers could check each operation as it was demonstrated. The managers questioned the various steps of the operation and made suggestions. Sometimes a manager had a more efficient way of doing one step of the process than had been suggested. At the conclusion of the meeting, two of the managers wrote a revised analysis of the particular study. The material was then typed and sent to the managers for use in instructing their employees.

As a result of this study, the managers and workers developed a more analytical attitude toward their jobs, and a renewed interest was shown in developing more efficient methods of performing their jobs and raising standards. We have at least started the employees thinking about the food preparation analysis and we hope that some employees will develop more efficient short cuts.

Even with the prevailing conditions of food, labor, and equipment, we should all aspire in our departments to have simple, well prepared food, which means that each item served is flawless.

THE ACCOUNTING ASPECTS OF DIETARY PLANNING[1]

JUANITA I. KAHLER[2]

School of Home Economics, Kansas State College of Agriculture and Applied Science

Van Zile Hall, a women's residence hall at Kansas State College, was originally planned to house 130 women. It functioned as planned until the fall of 1933 when it was decided to operate the hall on a plan that would make possible lowered living costs for students who wished to share in the work. For those residents who did not wish to accept these duties, the usual plan continued in effect.

This cooperative plan was also utilized for training students majoring in dietetics and institutional management. These students were required to live in the residence hall and to work in a supervisory capacity for one semester as a prerequisite for graduation. Their training was supervised by the residence hall dietitian who was a member of the institutional management staff.

[1] Presented in partial fulfilment of the requirements for the degree of Master of Science in home economics.

[2] Now assistant professor of institutional economics, Washington State College, Pullman, Washington.

Data for this study were obtained from records kept over a 10-year period in the office of the food director and from the college business office. The records of the total yearly income were obtained from the state auditor's reports.

TABLE 1

Income and expenditures in a women's resident hall for a 10-year period

		PERCENTAGE OF EXPENSES	
Income			$155,169.83
Expenses			
Food	$89,948.71	57.96	
Supervision	16,492.54	10.62	
Wages	1,994.81	1.28	
Utilities			
Telephone	687.50	.43	
Electricity	1,287.53	.83	
Water	591.51	.38	
Steam	2,679.95	1.72	
Gas	717.54	.46	
Laundry	6,602.80	4.26	
Repairs and replacement	10,734.93	6.91	
Cleaning supplies	949.54	.61	
Paper goods	753.82	.48	
Office supplies	374.08	.24	
Miscellaneous	1,385.39	.89	
Total			[1]35,200.65
Surplus			19,969.18

TABLE 2

Food expenditures for a 10-year period

FOOD ITEM	TOTAL EXPENDITURE	PERCENTAGE OF TOTAL EXPENDITURE
Milk and milk products	$16,060.03	17.85
Butter	7,656.07	8.50
Potatoes and sweet potatoes	2,277.56	2.53
Dry, mature beans, peas, and nuts	678.46	.75
Fruits		
Canned	4,783.06	5.30
Fresh	5,962.37	6.62
Vegetables		
Canned	4,649.77	5.16
Fresh	8,481.18	9.42
Eggs	4,279.54	4.76
Meat, poultry, and fish	19,729.46	21.93
Starches, flour, and cereals	7,086.44	7.88
Other fats	1,697.84	1.89
Sugar	1,360.30	1.50
Miscellaneous	5,246.63	5.63
Total	$89,948.71	100.00

A summary of all expenses of the food service department expressed in terms of dollars and in percentages for the 10-year period is shown in Table 1.

One good way to judge a food drink

WE BELIEVE that one good way to measure the merits of a food drink is to appraise it specifically on the amount of nutrients it actually contains.

That is why Borden's calls particular attention to the relatively high nutritive content of Hemo—Borden's chocolate-flavored food drink.

As the chart on the right indicates, Hemo is fortified with significant amounts of essential vitamins and minerals. It is flavored deliciously . . . given scrupulous care in all stages of its preparation and packaging.

In short, it is as *nutritionally sound* and as *medically acceptable* as we can possibly make it.

We have purposely endeavored to develop such an outstanding food drink, so that whenever the need for a special-purpose food arises, doctors will be glad to recommend Hemo.

We print the chart at right, so you can see at a glance how the vitamin and mineral content of Hemo compares with minimum daily adult requirements of these elements:

Hemo compared with minimum daily adult requirements*

	Minimum Daily Adult Requirements*	1½ ounces of Hemo and 16 fluid ounces of milk (2 glasses)	1½ ounces (2 servings) of Hemo Powder
Vitamin A	4000 U. S. P. Units	4900	4000
Vitamin B_1	333 U. S. P. Units	400	333
Vitamin B_2	2 Milligrams	3	2
Vitamin D	400 U. S. P. Units	410	400
Niacin amide	* *	10.3 mg.	10 mg.
Iron	10 Milligrams	15.7	14.7
Calcium	750 Milligrams	950	376
Phosphorus	750 Milligrams	750	288

**As set by Federal Security Administrator under authority of the Federal Food, Drug, and Cosmetic Act. (Hemo does not contain Vitamin C.)*

***Minimum daily adult requirements not yet fully established.*

Borden's

Hemo

IF IT'S BORDEN'S, IT'S GOT TO BE GOOD!

POWDER OR LIQUID

A surplus of 13 per cent of the total 10-year income remained after all bills had been paid. This cannot be considered a profit inasmuch as the residence hall was built by a legislative appropriation and no rent or interest on the investment was paid. It may, however, be considered equivalent to rent or to amortization on the building, customarily paid by residence halls which have not been financed by appropriation.

Although the study was concerned chiefly with the financial accounting of a cooperative food service unit, the nutritional aspect was too important to be disregarded. For this reason the food purchased and used over this 10-year period was classified according to food groups. These groups were: milk and milk products; butter; potatoes and sweet potatoes; dry, mature beans, peas, and nuts; fruit, canned and fresh; vegetables, canned and fresh; eggs; meat, poultry, fish; starches, flour, and cereals; other fats; sugar; and miscellaneous groceries.

Table 2 shows expenditures and percentages of the total food budget spent for each item of food over the 10-year period

TABLE 3

A comparison of food expenditures of a women's cooperative residence hall with other standards

INVESTIGATOR	MEAT, FISH, POULTRY, EGGS	MILK, CREAM, CHEESE	FRUITS AND VEGETABLES	CEREALS AND CEREAL PRODUCTS	FATS, SUGARS, AND ACCESSORIES
	%	%	%	%	%
Gillett (1)	20.0 or less	20.0 or more	20.0±	20.0 or more	20.0 or less
Stiebeling and Ward (3)	15–20	25–30	25–30	10.0	15–20
Present study	26.7	17.9	29.8	7.9	17.7

FINDINGS

The results of this study were compared with the standards established by Gillet (1), Sherman (2), and Stiebeling and Ward (3) for the division of the food dollar. Figures for the present study and for the study of Gillet (2) and Stiebling and Ward (3) are shown in Table 3.

REFERENCES

(1) GILLETT L. H., AND SHERMAN, H. C.: The adequacy and economy of some city dietaries. N. Y. Assn. Imp. Conditions of Poor. 121: 32, 1917.

(2) SHERMAN, H. C.: Chemistry of Food and Nutrition. 7th ed. New York: Macmillan Company, 1946.

(3) STIEBELING, H. K., AND WARD, M. M.: Diets at four levels of nutritive content. U. S. Dept. Agric. Circ. 296, 1933.

OTHER REFERENCES

(1) DAVIS, C. E.: A study of the nutritive value and cost of food consumed by college students eating in a cooperative group. Unpublished thesis, Kansas State College of Agricultural and Applied Science, 1934.

(2) CHANEY, M. S., AND ROGGE, E.: The first year of a college cooperative house. J. Home Econ. 27: 166, 1935.

(3) HAROLD, F. L.: A study of the cost of food consumed at the women's residence hall at Kansas State College. Unpublished thesis, Kansas State College of Agriculture and Applied Science, 1936.

(4) CRAWFORD, M.: The operating expenses of the food units in two residence halls of Texas State College for Women: Budgeting the food dollar. Unpublished thesis, Texas State College for Women, 1937.

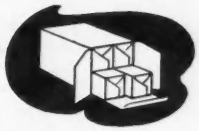
(5) DAVIS, M. J.: Policies of financial management in cooperative food departments. Unpublished thesis, Iowa State College, 1937.

(6) SAYLOR, N. L.: A study of the financial management of the five cooperative houses for women at Oregon State College. Unpublished thesis, Oregon State College, 1940.

BRITTLE CRACKED FINGER NAILS

IT SHOULD first be determined whether the poor structure of the nails is part of a larger ectodermal defect in which other ectodermal structures, such as teeth, hair, and sweat glands, may be stunted, deformed, or lacking. Otherwise the approach most apt to lead to successful management is the nutritional. The liberal use of vitamins A and C as well as the B complex has been said on different occasions to overcome the brittleness of nails. Klander has laid emphasis on sulfur in the economy of nails. The use of foods rich in sulfur, containing the sulfur amino acids, such as methionine and cystine, would be more apt to prove effective than inorganic sulfur. A lack of iron can change the structure of the nails and alter their appearance. Determination of the hemoglobin value and administration of ferrous sulfate may be enlightening and of value. The endocrine glands are said to influence nail growth. The thyroid seems to be the most important in this category. The use of its dried product may improve the nails, but this should be done only after due consideration of the general condition of the patient. Occupations or pursuits that lend themselves to drying of or brittleness of the nails should be investigated. For example, the frequent use of nail polish removers, or exposure to industrial solvents may contribute to this.—*From Queries and Minor Notes, J. A. M. A. 131: 1182, 1946.*

"The Best Buy in Butter"



Today, the American housewife has little faith in price alone as a yardstick of quality. She now looks for other, more dependable evidences of quality . . . and in buying butter, she looks for the paraffined carton.

In the paraffined carton she "sees" the integrity of the butter's manufacturer . . . the maker's pride in the superior quality of his butter and his wish to protect this superior quality from creamery to the dinner table.

The paraffined carton has become the symbol of "the best buy in butter." That is why more and more well-informed homemakers are refusing to accept butter packaged any other way, because they know that butter inadequately protected as to flavor and quality is never a bargain.

Why the Best Butter is Packaged in Paraffined Cartons—

1. Preserves quality and flavor.
2. Keeps out undesirable odors.
3. Protects perishable body and texture.
4. Gives better sanitary protection and prevents crushing.
5. Reduces moisture loss.
6. Convenience in handling.
7. Guards against rancidity.
8. Provides brand identification and assurance of quality.

Paraffined Cartons are also used in packaging Ice Cream, Margarine, Lard, Shortening, and Frozen Foods

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THE BEST BUTTER IS PACKAGED IN *Paraffined* CARTONS

Book Reviews

Diet Therapy Handbook. By Dorothea F. Turner. University of Chicago Press, 1946. Price $2.

Sponsored by the American Dietetic Association, this new book provides a flexible and interpretative approach to the therapeutic diet. Furthermore, the content has been organized to provide the user maximum simplicity and ease in use.

The value of the *Handbook* is enhanced by the many outstanding studies made by the committees of the Diet Therapy Section of the Association over a period of years which have been incorporated and integrated into an up-to-date, authoritative compilation. The book will be of immediate and practical use as a frequent reference for the student dietitian, staff dietitian, student nurse studying dietetics, the medical student who is studying diet in disease, as well as the student of home economics who is studying diet therapy.

Emphasis has been given to the modern trends in diet therapy: first, in the clarification of terminology used in diet therapy; second, in the organization of a basic or foundation dietary pattern; third, in a new approach to dietary calculations; and fourth, in calling attention to the need for a more realisitic consideration of the patient's food habits and the socioeconomic problems he must face in attempting to follow dietary recommendations.

Glossary of dietetic terms. As Dr. Fredrick Stare has noted, the field of diet therapy has been flooded with a variety of diets couched in controversial terminology which has resulted in serious confusion in the minds of the hospital staff regarding the content and use of many therapeutic diets. In the past, diets have sometimes been named in terms of the disease, occasionally after the author of the diet, or frequently in terms of the nutrient content.

To obtain accuracy and consistency in terminology, a committee of the Diet Therapy Section under Dr. Jeanne d'Arc Hurley, Dorothy Duckles Hudson, and Frances MacKinnon worked for two years on the preparation of a Glossary of Dietetic Terms. Definitions of terms were set up and many categories of diets eliminated. The value of this study was increased by the fact that it was collected by several state committees and submitted to more than 200 members of the American Dietetic Association for correction. The diets presented in this *Handbook* have been based on the definitions given in this Glossary.

A basic or foundation dietary pattern for the therapeutic diet. In preparing this *Handbook*, an attempt has been made to present an interpretative method for use in organizing the therapeutic diet. A basic outline has been formulated with an enumeration of the value and use of each food which composes a *daily* dietary plan. With this information, foods may be interchanged and amounts varied to meet the needs of the individual patient, with full awareness of the nutritive content and a minimum of calculation. The practical usefulness of the basic dietary is further increased by the inclusions of both everyday measures and metric weights for the sizes of portions used.

Dietary calculations. To clarify the thinking in the matter of making adequate dietary calculations, it became necessary (a) to reconsider the selection of figures on food composition in order to obtain up-to-date and authoritative data, and (b) to evaluate the degree of detail necessary in the calculation of the nutritive content of the diet.

To meet the need for representative values on food composition suitable for use in dietary calculations, the Committee on Food Composition of the National Research Council and the Bureau of Home Economics and Human Nutrition have assembled, coordinated, and appraised data on food composition with a view to obtaining appropriate values. These figures have been included in the Appendix of the *Handbook* for reference.

Furthermore, these figures have been used in the preparation of a shortened method of dietary calculation. The advantages of shortened methods have been reported by various workers. Recently, a committee of the Diet Therapy Section, with Dr. May Reynolds as chairman, cooperated with Drs. Jane Leichsenring and Eva Donelson in the revision of their shortened method of dietary analysis. A tentative revision of their table was circulated among the members of the Diet Therapy Section and suggestions obtained for modifications which would better adapt the table to the needs of the hospital dietitian. This revised shortened method of calculating the nutritive content of the diet has been used in the evaluation of each therapeutic diet presented in the *Handbook*. Such a shortened method should result not only in a great saving of time to students and staff, but it should be of particular value to institutions in presenting comparative values of foods and food groups with greater simplicity and ease.

The table will be of practical value since both the everyday measures and metric weights of portions used in the daily diet are given.

Food habits. To call attention to the need for a more realistic consideration of the dietary problems of the individual patient, a study was initiated by a joint committee of the Diet Therapy Section working with the Committee on Food Habits of the National Research Council. As stated by Dr. Margaret Mead, "the increased emphasis upon the importance of the patient's whole personality makes new demands upon the dietitian as increased knowledge shows the way in which specific food behaviour, and disease pictures requiring special diets, are themselves concomitants of deep-seated personality distortions and overemphases." The initial report of this committee is incorporated in the *Handbook*.

The *Handbook* should be of immediate value as an up-to-date and authoritative reference for the clinician who wishes a flexible, interpretative approach to diet therapy. In addition, the student dietitian, the staff dietitian, the student nurse who is studying dietetics, the medical student who is studying diet in disease, and the student of home economics who is studying diet therapy will find it a helpful reference.

It is planned that the *Handbook* will be revised frequently to incorporate the results of further studies of the Diet Therapy Section and to maintain up-to-date and authoritative information for the use of professional workers and students in this field of specialization.

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Current Literature

Contributed by Janet Engebretsen, Janette C. Carlsen, and Ethel M. Miller, Dietary Department, Johns Hopkins Hospital; Lorraine G. Weng and Marian T. Straube, University of Chicago Clinics; and Quindara Oliver Dodge, Women's Educational and Industrial Union, Boston.

AMERICAN JOURNAL OF DISEASES OF CHILDREN

Vol. 71, June, 1946

* Relation of ascorbic acid to effectiveness of iron therapy in children. H. V. Schulze and A. F. Morgan.—p. 593.
* Goat's milk as a source of bone building mineral for infant feeding. A. D. Holmes, J. W. Lindquist, and H. B. Rodman.—p. 647.

Ascorbic Acid Relationship to Hemoglobin. A group of children with similar blood pictures living under identical environmental conditions were studied. The dietary intake of all subjects was computed to make sure that each received a daily intake of 33 mg. ascorbic acid and 11 mg. iron. One group received a daily addition of 100 mg. ascorbic acid and the other a lactose placebo. The group which had additional ascorbic acid did not show any response, in that the blood picture remained the same as the other group. It appears that the relationship between ascorbic acid and synthesis of hemoglobin is not affected by over-saturation of the vitamin. The increase in the hemoglobin levels for groups in the entire study was from 11 to 14 mg. per 100 cc. blood.

Goat's Milk. Many similiarities exist in the composition of goat's milk and human milk. The protein content of goat's milk is two to three times greater than human milk, and the ash content is much greater. On 24 fresh samples of goat's milk, assays showed a very high calcium, potassium, and phosphorus level. Nevertheless, until a statement can be made as to the utilization of the minerals, appraisal cannot be made as to the effectiveness of this milk as a bone-builder.

AMERICAN JOURNAL OF THE MEDICAL SCIENCES

Vol. 212, July, 1946

* Reactions to intravenously administered amino acids (casein hydrolysates). H. H. Hecht.—p. 35.

Intravenous Amino Acid Administration. In over 500 intravenous injections of parenamine, only 22 reactions (none serious) took place. It is felt that at least 10 reactions could have been avoided if more care had been taken in preparation of the solution and rate of flow had been watched. Nausea was generally noted if the rate of flow was more than 15 gm. per hour. In liver disease patients, reactions were the same as the general group.

AMERICAN JOURNAL OF ORTHOPSYCHIATRY

Vol. 15, January, 1945

* Feeding disturbances in very young children. S. K. Escalona.—p. 76.

Feeding Disturbances in Very Young Children. Observations reported in this article concern the eating behavior of children ranging from 10 days to 24 months in age. The observations were made at the Massachusetts Reformatory for Women, Framingham, by the author. The reformatory maintains a nursery for children of the prisoners or "students." The babies were cared for by their own mothers whenever possible. Records were kept of each child's development in physical, motor, mental, and emotional spheres. The following hypotheses have been formulated by the author from her observations:

(a) When infants and young children are brought in close contact with an adult, they perceive the emotional state of the adult and respond to it in a consistent manner.

(b) Eating behavior of infants and young children may serve as a sensitive indicator of their general adjustment

THE AMERICAN JOURNAL OF PHYSIOLOGY

Vol. 146, July, 1946

* Exchanges of heat and tolerance to cold in men exposed to outdoor weather. E. F. Adolpy and G. W. Molnar.—p. 507.
* The tolerance of man to cold as affected by dietary modifications. High versus low intake of certain water soluble vitamins. W. Glickman, R. W. Keeton, H. H. Mitchell, and M. K. Fehnstock.—p. 538.

Heat Exchanges in Man Outdoors. Men nearly nude were exposed outdoors to environment ranging from uncomfortably warm to bitterly cold. Their responses were measured in terms of pulse rates, arterial pressures, deep and superficial temperatures, heat exchanges, ventilation rate, urinary flow, and blood concentrations. It was found that surface temperatures were proportional to air temperatures over a wide range; that oxygen consumption occasionally varied two fold, while in shivering the consumption might be augmented five fold. The inability of men to produce sufficient heat to compensate for severe loss of heat was demonstrated; and heat loss from storage (body cooling) need not pass from deep tissues outward and for this reason heat is uncontrolled by the insulating shell of outer tissues.

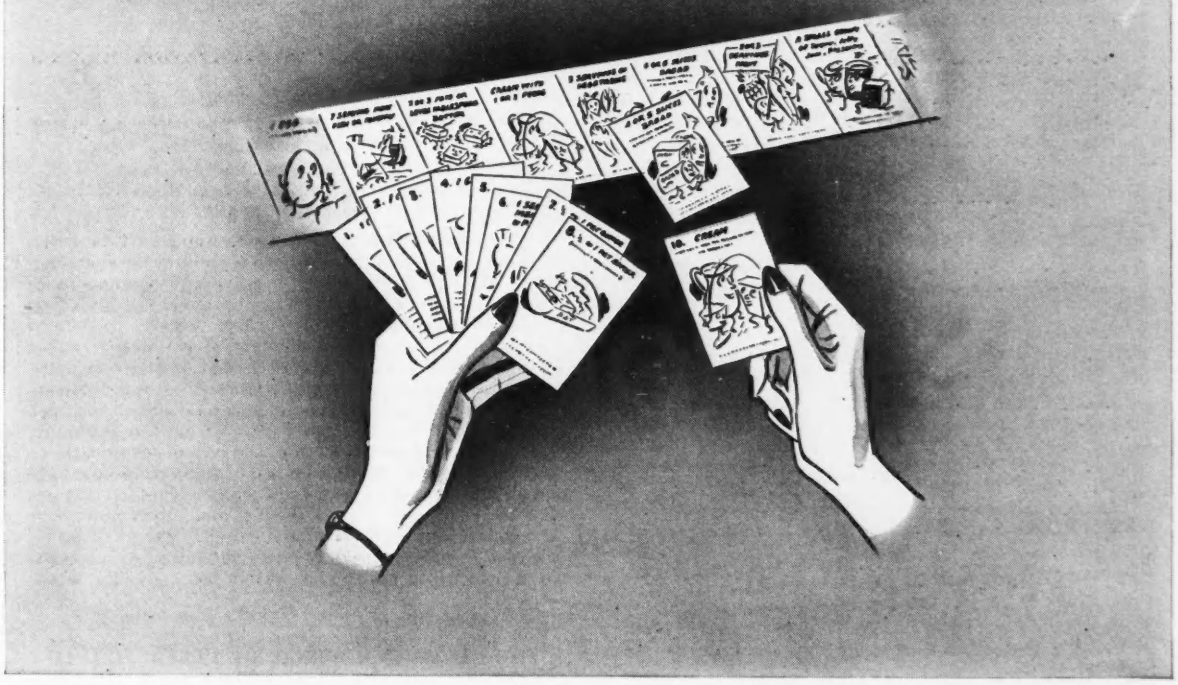
Diet and Tolerance to Cold. Experiments were carried out upon 12 healthy young men over a period of 150 days to determine the effect of supplements of the water-soluble vitamins on their ability to withstand repeated exposures of intense cold. The tolerance to cold was measured by changes in rectal and mean skin temperature and in the performance of a series of psychomotor, perceptual, and intelligence tests. The results of these tests clearly indicated that the water soluble vitamin supplements did not appreciably increase the men's ability to withstand cold.

AMERICAN JOURNAL OF PUBLIC HEALTH

Vol. 36, July, 1946

* Milk-borne disease in Massachusetts, 1941-1945. R. F. Feemster.—p. 777.

A GRAND SLAM FOR TEACHERS



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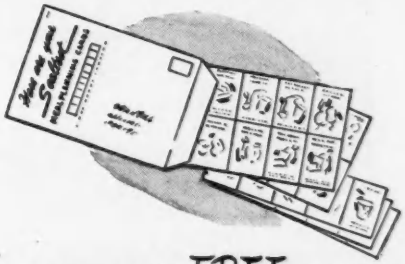

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Milk-borne Disease. The incidence of milk-borne disease decreased in this state although the consumption of milk increased during the war years. Most of the milk used was pasteurized, but certified milk was available in some communities. Two epidemics which occurred in the period covered by this report were traced to raw milk.

ARCHIVES OF PEDIATRICS

Vol. 63, May, 1946

* The prevention of problem behavior. H. C. Archibald.—p. 216.
* The nutritional element in the causation of neuroses. W. S. Christopher.—p. 242.

Prevention of Problem Behavior. Problem behavior results from tension between the child and his environment. Parents can prevent many behavior problems by understanding the child and realizing that certain behavior patterns are characteristic of certain age groups.

Nutritional Element in Causation of Neuroses. This paper was read before the sixth annual meeting of the American Pediatric Society, May 29 to June 1, 1894. It is interesting from the standpoint of noting the progress that has been made in the field of nutrition in the past 50 years.

ARCHIVES OF INTERNAL MEDICINE

Vol. 77, June, 1946

* Allergy: a review of the literature of 1944 and 1945, with comments on future problems. F. M. Rackerman.—p. 700.

Vol. 78, July, 1946

* Allergy: a review of the literature of 1944 and 1945, with comments on future problems. F. M. Rackerman.—p. 108.

Allergy. The first in a series of two articles reviewing the 1944 and 1945 literature on allergy. Although not a great amount of new material was written on this subject during the war, this review presents the material in a very readable form.

Allergy. Conclusion of the article in previous month's issue. This is devoted entirely to hay fever and asthma.

BRITISH MEDICAL JOURNAL

No. 4462, July 13, 1946

* Inadequate feeding in hospitals. J. A. F. Stevenson, J. Whittaker, and R. Kark.—p. 45.

No. 4464, July 27, 1946

* Vitamin C nutrition in northeast England. J. Black.—p. 122.

Inadequate Feeding in Hospitals. The cause for the loss of weight of patients in military hospitals in Canada has been investigated. Primarily, this appears to depend on the "toxic" or metabolic destruction of body protein, but is aggravated by the inadequacy of the usual hospital diets. These diets were particularly inadequate in proteins and calories, in relation to the requirements of these patients. In 1944 the Research and Development Branch of the Directorate General of Medical Services, in cooperation with the National Research Council of Canada, MacDonald College, and the Royal Victoria Hospital, had developed a satisfactory powdered high-protein milk-shake mix with five assorted sirup flavorings which was easily reconstituted into a palatable and acceptable drink. By this means an extra 72 gm. of protein and 1100 calories could be given in the form of two small and one large milk-shake during the day. The cause for the inadequate diets was found to lie in: (a) the tendency of hospital staffs to economize; (b) the lack of proper supervision of dietary intakes by the medical and nursing staffs; (c) improperly spaced meals and lack of appetizing dishes. Correction of these faults and the introduction of a high-protein milk-shake raised the food consumption to satisfactory levels. The average maximum tolerable consumption has been defined.

Vitamin C Nutrition in Northeast England. In a study made during the winter and spring months of 1943 of the vitamin C balance of 100 adults living in a mining town on the northeast coast of England, the men on the whole were well nourished, many of the women had less satisfactory reserves. Diminished reserves were found more often among those women whose husbands were living away from home than among those whose husbands were at home. The quickest response to medication was seen in those cases which had a satisfactory history. The inadequate intake of vitamin C was due to apathy or ignorance and not to poverty or non-availability of suitable foodstuffs.

THE CANADIAN MEDICAL ASSOCIATION JOURNAL

Vol. 55, July, 1946

The effect of low protein diet on the structure of the pancreas. S. M. Freedman and C. L. Freedman.—p. 15.

Vol. 55, August, 1946

* A review of health conditions in children in postwar Europe. R. R. Struthers.—p. 152.

Health Conditions in Children in Europe. This article is an account of health conditions in children in some countries in Europe as viewed by the author. Visits were made in France, Belgium, Holland, and Germany in 1944 and 1945. Differences were apparent from country to country and from community to community within a country, but in general there seemed to be little evidence of severe nutritional deficiencies, although undernutrition was common. The mortality rate among artificially fed infants was high in many places because of lack of an adequate milk supply, lack of means of pasteurization, and lack of soap. Growth seemed also to be affected as gains in height and weight were not as great as would be expected with a liberal food intake. Famine edema, rickets, chilblains, and tuberculosis were encountered in some of the European children. The author felt that at present the most acute nutritional deficit exists in Vienna where the food situation has markedly deteriorated.

THE CANADIAN JOURNAL OF PUBLIC HEALTH

Vol. 37, July, 1946

* Nutrition problems of preschool children. H. J. Leeson.—p. 279.

Nutrition Problems of Preschool Children. Feeding problems in preschool children have been eliminated by the nursery school procedures and, with a little care, these procedures can be transferred to the home environment. These nursery school procedures include the following: first, the type of meal, with emphasis on meat, vegetable, fruits, and whole grain cereals, and with no sweets and pastries; second, the lack of emotional approach to meals. Then the other little procedures such as giving small helpings to encourage appetite, help in learning to take new foods, and rest before the meal all help in the prevention of feeding problems.

THE JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION

Vol. 131, June 29, 1946

* Occidental beriberi heart disease. M. A. Blankenhorn, C. F. Vilter, I. M. Scheinker, and R. S. Austin.—p. 717.

Vitamin E and heart disease. An editorial.—p. 746.

Menu-balancer—at BREAKFAST LUNCHEON DINNER

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The rich flavor, color and consistency of Libby's Tomato Juice has made it America's *favorite* brand. It's a truly *delicious* juice . . . *rich* in the goodness of vine-ripened tomatoes, with only a touch of salt added.

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Vol. 131, July 6, 1946

Vitamin C in milk products. An editorial.—p. 828.

Vol. 131, July 20, 1946

* Overweight. Its prognostic significance in relation to hypertension and cardiovascular renal diseases. R. L. Levy, P. D. White, W. D. Stroud, and Brig. Gen. C. C. Hillman.—p. 951.

Vol. 131, July 27, 1946

Amino acids in wound healing. An editorial.—p. 1061.

Vol. 131, August 3, 1946

* Studies in glycosuria and diabetes mellitus in selectees. H. Blotner.—p. 1109.
* Salmonella typhimurium food infection from Colby cheese. C. B. Tucker, G. M. Cameron, M. P. Henderson, and M. R. Beyer.—p. 1119

Vol. 131, August 10, 1946

* Potassium deficiency occurring during the treatment of diabetic acidosis. J. W. Holler.—p. 1186.
* Synthetic folic acid therapy in pernicious anemia. L. A. Amill and M. Wright.—p. 1201.

Vitamin requirements of alcoholic addicts. An editorial.—p. 1212.

Occidental Beriberi Heart Disease. A study of 12 patients with beriberi heart disease is reported. Diagnosis, differentiating these cases from other types of degenerative heart disease, was made on the basis of elimination of other etiological agents, the use of a diet deficient in thiamin for longer than three months, and the presence of other evidence of nutritive deficiency, particularly neuritis or pellagra.

Response to thiamin administration was dramatic in only one instance. It was thought that the duration and the severity of the deficiency played a part in the reversibility of the process.

Autopsies performed on three cases revealed evidence of beriberi, and in two cases lesions of the nervous system were noted. Case studies are included in the report.

Overweight. Analysis of the medical records of 22,741 Army officers showed significantly higher rates for later sustained hypertension among those who were overweight than for those in the control group. When, in addition to overweight, transient hypertension and transient tachycardia were present, the rate of the later development of sustained hypertension was 12 times as great as in the controls. It was concluded that the presence of one of these conditions by itself increases the probability of later sustained hypertension. The presence of two of these conditions is of greater importance, and the presence of all three is of major prognostic significance.

Glycosuria in Selectees. It was found in a study of the selectees who appeared for Army pre-induction examinatons at the Boston Induction Station that 2 per cent of the men examined, or 1383 cases, showed glycosuria. Of this group 57 per cent definitely had diabetes, while many of the others were potential or borderline cases. Many of the diabetics had normal fasting blood sugar levels and sugar-free fasting urine specimens, indicating that these routine tests do not rule out diabetes.

Glycosuria and diabetes appeared more frequently in the older age group, although a fairly large percentage were 18–23 years of age. Only one fourth of the group showing glycosuria knew that they had previously had either diabetes or glycosuria. Of these, almost half gave a family history of diabetes, while 24 per cent of those with newly discovered glycosuria gave a family history of diabetes. There was evidence that nationality plays a part in the incidence.

This study indicates that there is opportunity for preventive medicine in the treatment of diabetes. Early attention to potential cases may help in preventing them from developing true or severe diabetes.

Food Infection from Cheese. Early in 1945 an epidemic of food infection extending over three states was traced to the consumption of contaminated cheese. This cheese was sold soon after manufacture without the usual storage for curing. Salmonella typhimurium was isolated without difficulty, and a sample of the cheese held at 43–45° F. yielded a viable culture even after 302 days. Pasteurization of the milk used in making cheese and strictly enforced sanitary measures are recommended.

Potassium Deficiency. It is well known that deficiency of serum potassium may result in the paralysis of the voluntary muscles. A case is reported in which a young comatose diabetic in severe respiratory distress responded dramatically to the administration of potassium chloride. Her level of serum potassium had been reduced to a degree endangering life. It has been shown that dehydration or diuresis may result in increased loss of potassium in the urine. Glycogenesis has also been shown to remove potassium from the serum.

Folic Acid Therapy. Clinical improvement and hematologic remission is reported in six cases of Addisonian pernicious anemia following administration of various oral and parenteral doses of synthetic *L. casei factor* (folic acid).

JOURNAL OF THE INDIAN MEDICAL ASSOCIATION

Vol. 15, May, 1946

* Ascites associated with nutritional deficiency. V. Gopal Rao.—p. 254.

Ascites. Of 343 consecutive cases of ascites studied during a two-year period in the Osmania Hospital, Hyderabad-Deccan, 52 cases or 15 per cent were classed as ascites due to "nutritional deficiency," since no definite organic disease could be detected. The condition was most common among males of the cultivator or laboring classes in the young adult and middle aged group whose diets showed (a) preponderance of carbohydrates, chiefly rice and millets; (b) deficiency of fat; and above all (c) deficiency of animal protein, e.g., milk, meat, and fish. This condition was characterized by the presence of ascites, edema, and in some cases pleural and pericardial effusions. There were signs of moderate degree of anemia and hypoproteinemia but no detectable signs of cardiac, renal, or hepatic insufficiency were present.

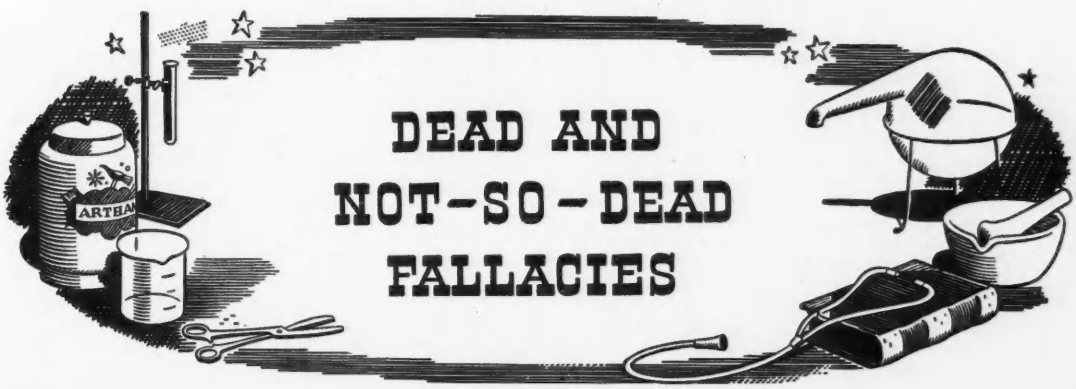
The patients were placed on a bread and milk diet which yielded, on an average: protein, 69 gm.; fat, 49 gm.; and carbohydrate, 377 gm. This was supplemented by a sweet lime and 1 oz. of dried brewers' yeast. Iron was given for anemia cases; also a few injections of liver extract and thiamin hydrochloride were used for serious cases. Under this regime the patients gradually improved, the urinary volume increased, and edema and ascites disappeared. A liberal mixed diet was then allowed. This diet supplied: protein, 68 gm.; fat, 42 gm.; and carbohydrate, 456 gm., and consisted chiefly of meat, milk, vegetables, cereals, and bread. After the disappearance of ascites and edema the patients began to gain weight, their general condition improved, and they were inclined to go back to their work.

Thirty-two of these 52 cases were discharged as clinically recovered, 10 improved, 7 discharged otherwise, and 3 died. The attempt at follow up was not very successful, but at least 15 were known to be in good health for varying periods up to two years after discharge.

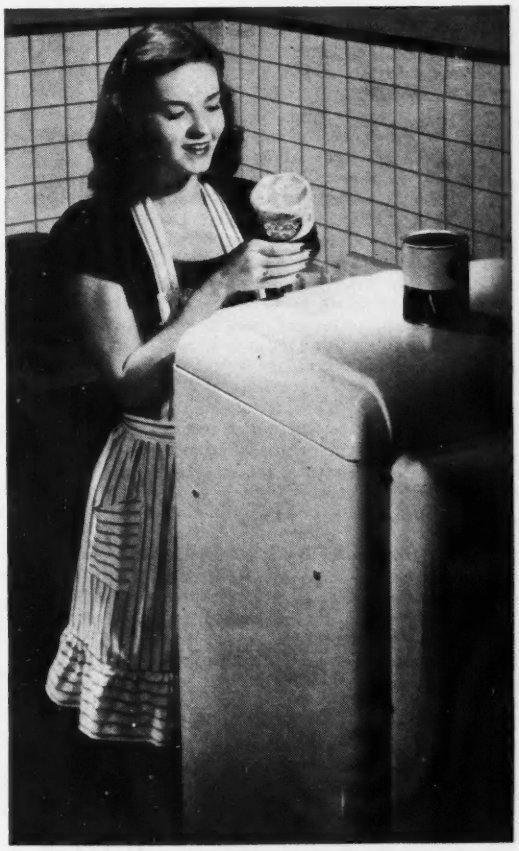
THE JOURNAL OF NUTRITION

Vol. 32, July 10, 1946

* A comparison of thiamine synthesis and excretion in human subjects on synthetic and natural diets. M. L. Hathaway and J. E. Strom.—p. 1.
* A comparison of riboflavin synthesis and excretion in human subjects on synthetic and natural diets. M. L. Hathaway and D. E. Lobb.—p. 9.



Once-trusted "cure" for asthma: An ash tree of about the same age as the patient was selected, and the patient led to it at midnight in moonlight. A nail was driven into the tree through the patient's braided hair, which was then cut off.



A fallacy that flourishes today is: Canned foods are made unwholesome by freezing. This has no foundation in fact. True, some foods may be changed in appearance by freezing. But their nutritive value is not affected.

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WORLD'S LARGEST MANUFACTURERS OF FIBRE AND METAL CONTAINERS

* Nutritional significance of inositol and biotin for the pig. D. C. Lindley and T. J. Cunha.—p. 47.
* Studies on the comparative nutritive value of fats. IX. The digestibility of margarine fat in human subjects H. J. Deuel.—p. 69.
* The nicotinic acid, biotin, and pantothenic acid content of cows' milk. J. M. Lawrence, B. L. Herrington, and L. A. Maynard.—p. 73.

Thiamine Synthesis and Excretion. Three normal women were maintained on a synthetic diet containing 1.00 mg. of thiamine per day for seven weeks. This diet was followed, after a month's respite, by a diet of natural foods containing 0.84 mg. of thiamine per day. Excretion of thiamine in the urine was measured daily, and in the feces by five-day periods. The results showed that the daily urinary thiamine values were less on the synthetic diet than on the natural diet. The average values for daily excretion of "free" thiamine in the feces were less on the synthetic diet and greater on the natural diet. "Combined" thiamine of the feces was higher on the natural than on the synthetic diet, suggesting that the synthetic diet was less favorable for bacterial synthesis of thiamine than the natural diet. The fact that urinary thiamine excretions on the natural diet reflected the lowered thiamine intake and that increases of fecal excretion of "free" thiamine were small, might indicate that fecal synthesis of thiamine was not an important factor in the thiamine economy of the three subjects. The excretions of thiamine by these subjects and their apparent well-being on thiamine intakes of 0.84 to 1.00 mg. support the lowering of the recommended daily allowance for women to 1.1 or 1.2 mg. per day.

Riboflavin Synthesis and Excretion. Three normal women were maintained for seven weeks on a synthetic diet containing 1.09 mg. of riboflavin per day. The diet was followed, after a month's respite, by a diet of natural foods containing 1.33 mg. riboflavin per day. Throughout the study, 24-hr. urinary excretions of riboflavin were determined, and during two weeks of the time on the synthetic diet, 1-hr. fasting excretions were also measured. Fecal riboflavin excretions were measured by five-day periods. Daily urinary riboflavin values were less on the synthetic diet than on the diet of natural foods. Urinary riboflavin excretion showed no relation to urinary volume. Fecal riboflavin excretions on the diet of natural foods were 3.7 to 3.8 times greater than those obtained on the synthetic diet. On the diet of natural foods, total riboflavin excretions were 2.8 times greater than on the synthetic diet for all three subjects, and for two subjects the excretion exceeded the intake.

Inositol and Biotin for the Pig. Biotin and inositol are concerned with the efficiency of feed utilization, since a lack of these two vitamins, when sulfathalidine was fed, resulted in smaller gains being obtained when the same amount of feed was eaten by the pigs.

Nutritive Value of Fats. Digestibility experiments were performed on 10 subjects all in normal health. The experiments were carried out over a three-day period. Seven tests were made with margarine fat and three with butter fat. The margarine fat composed of hydrogenated domestic vegetable oils was found to be digested to an average of 97 per cent by normal men and women, which was an identical value obtained in three tests on butter fat. There was no evidence of any unpleasant physiological effect when a maximum of 111 gm. of margarine fat was ingested daily.

Vitamins in Cows' Milk. Modifications of the usual assay methods for nicotinic acid, biotin, and pantothenic acid, which were introduced in the analysis of cow milk samples, have been described. There was no evidence that a bound form of any of these vitamins exists in milk. The biotin levels showed great variation among the milks of individual cows. These variations were less marked in the case of nicotinic and pantothenic acids. The nicotinic acid content was found to decrease during the winter and early spring months and to increase during the summer and early fall months. A possible correlation with pasture feeding has been suggested. The biotin content had no apparent relation to the season. The concentration of nicotinic acid in the milk decreased regularly through much of the lactation period. The pantothenic acid content of the colostrum at the time of freshening was found to be relatively low. The pantothenic acid and biotin contents of milk are correlated, though the nicotinic acid level appeared not to be correlated with either. All three vitamins were found to be stable during pasteurization and exposure to sunlight.

JOURNAL OF PEDIATRICS

Vol. 28, June, 1946

* Galactemia. A. Goldbloom and H. F. Brickman.—p. 674.

Vol. 29, July, 1946

* A comparison of the vitamin C in mothers and their newborn infants. L. B. Slobody, R. A. Benson, and J. Mastern.—p. 41.

Galactemia. This article presents the histories of two infants who showed evidence of hepatomegaly, inanition, cataract, galactosuria, and galactosemia. The treatment of these children consisted essentially of the withdrawal of milk from their diet and a substitution of a Sobee formula for one and washed milk curds resuspended in Ringer's solution sweetened by corn sirup for the other. Other foods were added as the children progressed. Under this lactose-free regime, the galactosuria was eliminated, the liver decreased in size slowly, the cataracts improved, and they grew at a satisfactory rate.

Galactose metabolism and certain features of other cases of galactemia presented in the literature are also discussed.

Vitamin C in Mothers and Their Newborn Infants. The plasma ascorbic acid concentration of the newborn infant and of cord blood has been shown to be considerably higher than that of the maternal; however, plasma ascorbic acid levels are notoriously labile and dependent on recent dietary intake. Determination of tissue vitamin C provides more convincing evidence of true maternal-fetal relationships. A comparison of the vitamin C in 77 mothers and their newborn infants was made by the intradermal tests. The results showed that the test times for disappearance of the dye were always considerably shorter in the newborn infant than in the mother. These results are in agreement with reports of maternal-neonatal plasma ascorbic acid levels. The new born infant tends toward vitamin C saturation even if it must deplete the mother. Other vitamins, such as thiamin, may act in a similar fashion.

THE LANCET

Vol. 11, July 27, 1946

* Digestibility of high extraction wheaten flours. R. G. Booth and T. Moran.—p. 119.

Vol. 11, July 20, 1946

* Effects of slow starvation. G. B. Leyton.—p. 73.

Digestibility of High-extraction Wheaten Flours. The digestibility of a high-extraction flour is governed by the amount of bran it contains. An analysis of work done on six human subjects shows that the bran removed in the milling of wheaten flours of extraction higher than 85 per cent has a digestibility (energy) of about 40 per cent. *In vitro* experiments on a cooked clean bran have given a minimal digestibility of 34 per cent energy. The *in vitro* digestibility of the nitrogen in bran is about 65 per cent. The process of digestion of bran consists essentially of the absorption of the contents of the aleurone cells. Apart from any reduction in the consumption of bread, raising the extraction for 80 per cent to 90 per cent has reduced the calories supplied by bread by 6 per cent.

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Effects of Slow Starvation. This study, made while the writer was a prisoner of war, contains an interesting picture of the stages in slow starvation. The main clinical features of starvation are, in order of their appearance, loss of feeling of well-being, rapid physical and mental fatigue, increased desire for sleep, and loss of memory for recent events. The next stage produces clinical signs of which the most important are bouts of polyuria, decreased pulse rate, lowered blood pressure, lowered basal metabolic rate, and reduction in temperature. Edema as a direct result of lack of food is a late sign. The change in the mental outlook is part of the syndrome and develops concomitantly with the physical changes. There are constant changes in the blood resulting in a moderate progressive anemia and a reduction in the plasma-protein level. The liability to acute infections is not greatly increased by chronic starvation, but the incidence of tuberculosis among the half-starved is many times that found in well-nourished people. The recovery from chronic starvation in the absence of organic disease or vitamin deficiencies is excellent and complete, provided the patient is not moribund before further rations become available.

MENTAL HYGIENE

Vol. 30, April, 1946

* Mental illness and family routines. M. B. Trendley.—p. 235.

Mental Illness and Family Routines. Mental illness is estimated to afflict some member of one in every five families in the U. S. The individual who is mentally ill has received consideration but the impact on other members of the household has received little or no attention.

Therefore, 105 records of families in which there was mental illness of some member were studied. These records were taken from the files of family welfare organizations and a large mental hospital. The writer also spent one summer in an experimental hospital where she came to know the relatives of the patients.

The type of material gathered did not lend itself to tabulation but rather to generalizations on the effect of mental illness on the family routine and personality patterns of other members of the household.

Effects on family income, the socioeconomic status, ability to maintain normal routines in the home, permanency in housing, types of meals and foods served, regularity of serving meals, pleasure and calmness of the family mealtime, sleeping habits, regularity in school attendance, ability of children to study effectively are among the family routines mentioned which may be influenced by the mental illness of a member of a family.

MILBANK MEMORIAL FUND QUARTERLY

Vol. 24, July, 1946

* Some effects of famine on the population of Greece. V. G. Valaoras.—p. 215.
* Nutritional status of aircraft workers in Southern California. H. Borsook and D. G. Wiehl.—p. 251.

Effects of Famine in Greece. Vital statistics taken during the war famine in Greece indicate that at the beginning of 1941 births began to decrease while the number of deaths increased rapidly. These manifestations continued for two years until the beginning of 1943. There were more deaths of adult males than women or young children. The primary factor in this excessive mortality of the Greek population was due to starvation, since there was no other important epidemic complication.

The chronic malnutrition of the Greek population which occurred as a result of the war famine had marked effects on the population. In a somatometric survey made in 1942–43 on the children of Athens, it was found that the children were somewhat taller but weighed less on the average than those of similar ages examined 15 years earlier. In a 1945 survey, the average heights of children, ages eight to 14 years, had decreased, and at ages 12 to 14 years the children were shorter than in 1927–28.

In another survey in 1943 where the nutritional status of the individual was judged by the Pelidisi index, it was found that babies up to three years were almost normally fed because of baby-feeding stations organized during the occupation period; children from four to 14 years of age showed marked undernourishment; children over 14 were in a slightly better condition. In a survey in 1944, conducted along parallel lines, the only difference noted was that the mean was lower in the second indicating that the nutrition of the children became worse during the period between the two surveys.

Nutritional Status of Aircraft Workers. This article is a study of the nutritional status of aircraft workers at the Lockheed Aircraft Corporation, Burbank, California. The object was to determine the influence of diet and nutrition on health and industrial performance. The study began with 1173 men, but the number was reduced by half by terminations and transfers. They were divided at random into two groups; one received a vitamin supplement, the other a placebo. A third group was formed as a second control group at the end of the study year.

The diet histories obtained at the beginning and at the end of the study showed that the diets had remained essentially unchanged. The diets as a whole were low in yellow or green vegetables, citrus fruits or tomatoes, somewhat better in milk and possibly eggs, and adequate in meat.

The results seemed to indicate that there was a definite improvement in morale in the vitamin group, reduction in absenteeism and turnover, and improvement in general work performance; but there was only a very slight improvement in clinical signs of mild vitamin deficiencies. No acute or severe signs of nutritional deficiency diseases were found at the beginning or at the end of the study.

THE NEW ENGLAND JOURNAL OF MEDICINE

Vol. 235, July 18, 1946

* An outline for the treatment of severe burns. S. M. Levenson, R. W. Green, and C. G. Lund.—p. 76.

Treatment of Burns. This article recommends that whenever possible protein losses or deficiencies resulting from burns should be corrected by oral feeding. It is not enough for the surgeon to order a high-protein, high-calorie, high-vitamin diet. One must be certain that the patient is able to take the prescribed diet. Parenteral feeding should be continued as a supplement until oral feeding, with or without gavage, has been established at a sufficient level not only to maintain the patient in nutritional equilibrium but also to restore at a rapid rate all tissues that have been depleted. For a burn covering 20 per cent body area, 300–400 gm. of protein are needed; for a burn covering 10–19 per cent body area, 200 gm. protein are needed; and for a burn covering 5–9 per cent body area 125 gm. protein.

NUTRITION, ABSTRACTS AND REVIEWS

Vol. 15, April, 1946

Dietary requirements in human pregnancy and lactation. A review of recent work. R. C. Gary and H. O. Wood—p. 22.

Dietary Requirements in Pregnancy. These authors have prepared a comprehensive critical review covering the literature relating to nutrition and pregnancy and lactation during the past decade. Over 400 references are included which reveal an increased emphasis on the importance of an ample diet of natural good foods during pregnancy and lactation.

BY Mary I. Barber OF KELLOGG'S

WE'LL BE LOOKING FOR YOU AT THE CONVENTION!

Director of Kellogg's Home Economics Department Battle Creek, Michigan

FROM everything I hear, this year's ADA convention in Cincinnati will be a memorable one. It will be a homecoming party for many of our members who have been serving overseas and an exciting get-together for the rest of us. A wonderful opportunity to compare notes and gather first-hand impressions of all that is going on in the world of food!

When you stop and think that it has been two years since we have been able to hold our annual convention, you realize how much we have to catch up on! There are plenty of immediate problems to discuss, too.

It is hard to say what is most pressing. Certainly, the grain situation will have top priority in many minds. And, certainly, everyone will want to hear from those who have just come back from Europe about conditions in the famine areas.

Then, too, there will be a busy and thriving personal intelligence section on our agenda. New addresses, new jobs, new husbands, new additions to the family—all must be discussed and approved!

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KELLOGG'S HOME ECONOMISTS — *Another famous Kellogg recipe passes a final kitchen test prior to release at the convention. Left to right: Regina G. Frisbie, Barbara L. Butler, Mary I. Barber, Winefred B. Loggans and Elaine D. Hudson.*

Social conditions have been found to be an important factor in successful pregnancy in England, with the poorer sections which supply the majority of babies usually having the poorest care and diet. In some areas, war brought about an improvement in nutrition of the poor through full employment and rationing, an improvement reflected in greater reproductive efficiency. Eclampsia, difficult labors in spite of smaller infants, stillbirths, and high infant mortality were found to be frequently associated with poor prenatal diet. Lactation was less well sustained on an inadequate diet.

In regard to maternal weight, it was clear that overweight impairs successful pregnancy. The average weight gain during pregnancy was found to be about 24 per cent of the original weight, although there was wide individual variation. Economic and social status had little effect on the birth weight of infants. There was no evidence that a baby's weight may be safely restricted by dietary means.

From recent work it was concluded that pregnancy demands little increase in the energy requirement, and that the daily addition of only 500 calories will take care of the increased need during lactation.

While most of the literature suggested restricting carbohydrate to the extent of keeping maternal weight gain under control, there was some evidence that a liberal carbohydrate intake protects the liver cells, especially if there is any fear of pre-eclampsia. Little was done to determine importance of fat during this period except as a means of attaining high-caloric standards.

Since 1935 there was a tendency to advocate a somewhat smaller intake of protein during pregnancy than was previously considered necessary. A diet containing 1.5 gm. per kg. body weight after the third month of pregnancy was generally believed adequate. In one study 60 to 70 gm. protein a day was given to a group of 700 pregnant women and 110 to 120 gm. protein to another group of the same number. Toxemias were roughly twice as common in the group on the lower protein intake, but premature births were more common on the higher protein diet. The average gain in maternal weight was greater in the first group, but birth weights of infants were unaffected by the protein content of the maternal diet. It appeared that there may be little demand for very high intakes of protein in pregnancy. On the other hand, there was no longer any fear of using protein when kidney function is impaired. It was concluded during lactation the protein intake should be increased to 2 gm. per kg. body weight per day.

A study of the metabolism of water and salt indicated that up to a certain point increased fluid retention is normal during pregnancy, but when the retention is excessive as in the case of toxemia, the restriction of salt intake seems to be an effective therapeutic measure. It was considered that adequate amounts of calcium, phosphorus, and magnesium would be supplied if ample quantities of milk and green vegetables are available. It was recommended that if supplementation of the maternal diet be considered desirable, it should be by adding natural foods to the diet and not by giving pure chemicals or pharmaceutical preparations.

Some workers felt that the anemia of pregnancy is merely a continuation of previous anemia, and that antianemic measures ought to be initiated before the pregnancy starts. The iron stored by the fetus and the iron in the mother's milk was thought to be sufficient to prevent anemia in full-term babies, at least for several months after birth.

There was a marked difference of opinion concerning the necessity for supplementing the natural diet with vitamin D. There is need for more work on calcium and phosphorus metabolism during pregnancy, as well as diagnostic criteria for rickets before the question can be settled. Vitamin E seemed to play no significant role in human pregnancy nor was there any satisfactory indication that the routine administration of vitamin K to either the mother or the newborn infant is necessary.

Deficiencies of thiamin were thought to be associated with vomiting in the early stages of pregnancy, as well as with the polyneuritis of pregnancy. If supplements seemed necessary, it was recommended that they be in the form of natural sources of the entire B-complex to prevent imbalance with other parts of the group. Administration of pyridoxine also seemed to be an effective treatment for hyperemesis gravidarum.

It was thought that the intake of vitamin C during pregnancy and lactation should be high, although opinion varies widely on its exact role during this period. Work has been done on its use in treating such conditions as gingivitis and vulvitis in pregnancy, habitual abortion, and the vomiting of pregnancy, but the results are inconclusive.

NUTRITION REVIEWS

Vol. 4, July, 1946

* Nutritional problems in the food industries. R. C. Newton, H. E. Robinson.—p. 193.
* Nutrition value of sunflower seed meal.—p. 221.

Nutrition Problems. Food industry has a part in two phases of the nutritional program—the adequacy of the diet and the education of the people to eat foods in right proportion. Obtaining improved raw products and producing food with known and uniform nutrient content is a primary problem. Electronic treatment to eliminate bacterial deterioration without losses in nutrients shows promise. Progress has been made in developing methods for determining nutrient losses in processing and cooking. Food industries should be interested in impressing the public with values of better nutrition practices. Publicity has been in the form of government nutrition charts, bread enrichment program, industrial nutrition, food fortification of margarine, iodized salt, and vitamin D enriched milk. Aggressive advertising tends to create an incentive for improvement of a product. Despite the educational work by community and government committees, it is believed that the greatest influence in making people nutrition conscious has come through the medium of paid advertising by the food industry. Advertising people must become better educated in the field of nutrition.

Sunflower Seed Meal. Increased production of sunflower seeds as a source of oil makes a critical evaluation of the nutritive quality of the meal remaining after extraction of particular interest. The B-vitamins and proteins of good nutritive value are present in abundance in sunflower seed meal. Experiments show that rats on a vitamin B-complex free basal diet to which 5 per cent sunflower seed meal was added made better gains than those on basal diet supplemented with 5 per cent wheat germ, corn germ, or soybean meal, but somewhat less than rats receiving 5 per cent dried brewers' yeast. Meal processed at low temperature by solvent extraction contains protein of biologic value comparable to protein of wheat, oats, and barley, but less than soybean flour. A comparison of the net protein content of sunflower seed meal (55 per cent) gives it an advantage over soy flour (30½ per cent) and considerable advantage over wheat (7.6 per cent).

THE PSYCHIATRIC QUARTERLY

Vol. 20, January, 1946

* Sudden graying of hair, alopecia, and diabetes mellitus of psychogenic origin. H. S. Barahal and N. Freeman.—p. 31.

Graying of Hair, Alopecia, and Diabetes Mellitus of Psychogenic Origin. This is a report of a rather unusual

In the Dietary of Diabetes Mellitus

Prior to the advent of insulin, excessive protein breakdown was a frequent occurrence in the uncontrolled diabetic patient. This protein waste manifested itself in the excretion of large amounts of nitrogen in the urine, a situation encountered even today when long standing diabetes mellitus is first detected in a patient.

The basis underlying this faulty protein metabolism is an increased conversion of protein to carbohydrate, derived from the glycogenic amino acids. Consequently, restriction of protein intake was justified, even at the expense of negative nitrogen balance.

Through the use of adequate amounts of insulin, protein breakdown for glycogenesis is largely preventable. Based on the modern concept of the vital role of protein in the body economy, the prescribed dietary initially provides at least 1.5 Gm. of protein per Kg. of body weight* to compensate for past negative nitrogen balance. After the first few weeks of treatment, the protein intake is dropped to not less than 70 Gm. daily.

This liberal protein allowance, readily "covered" by insulin, has the additional advantages of providing generous amounts of B complex vitamins, and of exerting a beneficial influence upon hepatic function, derangement of which is considered by some investigators to be a factor in the pathogenesis of diabetes mellitus.

Among the protein foods of man, meat ranks high as a source of biologically adequate protein, capable of satisfying all protein needs. It provides generous amounts of B complex vitamins, and enhances the biologic quality of less complete proteins derived from other foods.

*Stare, F. J., and Thorn, G. W.: Protein Nutrition in Problems of Medical Interest, J. A. M. A. *127*:1120 (April 28) 1945.

The Seal of Acceptance denotes that the nutritional statements made in this advertisement are acceptable to the Council on Foods and Nutrition of the American Medical Association.

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psychosomatic response, involving the almost total overnight graying of hair, the partial loss of hair, and the occurrence of diabetic symptoms as results of emotional influences.

The patient is a 38-year-old white soldier with a history of periods of nervousness and maladjustments. Soon after the patient's induction into the Army, he began to experience an aggravation of his neurotic symptoms and found it very difficult to adjust to Army life. Seven months later he suddenly turned gray overnight with an accompanying loss of hair and the appearance of the symptoms of diabetes mellitus. Since the diabetic symptoms promptly improved on hospitalization and recurred when returned to active duty, the author feels the diabetes, as well as the graying and loss of hair, is the result of emotional factors.

PUBLIC HEALTH NURSING

Vol. 38, July, 1946

* Diet in relation to poliomyelitis. J. Wright.—p. 345.

Diet in Relation to Poliomyelitis. It has been pointed out in recent years that patients severely paralyzed by poliomyelitis had been taking a poorly balanced diet especially lacking in vitamin B complex and vitamin E. There is evidence that the vitamin B complex increases resistance to certain diseases including poliomyelitis.

PUBLIC HEALTH REPORTS

Vol. 61, August 2, 1946

* Tuberculosis throughout the world. I. The prewar distribution of tuberculosis throughout the world. S. E. Yelton.—p. 1144.

Prewar Distribution of Tuberculosis. Using the tuberculosis mortality rate as an indication of the prewar prevalence of this disease, it appears that tuberculosis is widely disseminated throughout all areas which have been to any degree subject to the influence of civilization.

Denmark and the Netherlands in Europe, the United States, and Australia seem to be the only countries which have tuberculosis death rates of less than 50 per 100,000. New Zealand and the Union of South Africa may be added to the list if only the white population is considered. Very high rates were found in Alaska, Greenland, Newfoundland, and Labrador. North Africa, with the possible exception of Egypt, and Latin America also probably have a high incidence of this disease. Eastern Europe and Asia, with the possible exception of Ceylon and Palestine where the reported rates are fairly low, probably show a high prevalence of tuberculosis.

It is felt that the problem of tuberculosis will be intensified during the postwar years, particularly in Europe.

SOUTHERN MEDICAL JOURNAL

Vol. 39, July, 1946

* The prevention and control of disturbances of protein metabolism in rocky mountain spotted fever. G. T. Harrell, W. A. Wolfe, W. L. Venniny, and J. B. Reinhart.—p. 551.

Protein Metabolism in Rocky Mountain Spotted Fever. In this study the administration of a high-protein diet appears to have a definite value in the therapy of Rickettsial spotted fever. The daily protein requirement seems to be in the range of 4 gm. per kg. of normal body weight. With a high protein intake, the amount of edema and the amount of preformed protein required for support of the circulation was reduced. Although, blood protein levels, especially the albumin fraction, were only slightly better maintained, there appeared to be less depletion of body proteins, as measured by studies of the urinary nitrogen excretion.

BAKERS' HELPER

Vol. 86, July 13, 1946

* How to make effective use of insecticides. E. H. Fisher.—p. 48.
Streamlining the distribution machinery. G. N. Graf.—p. 58.
The American pie. M. Spoth.—p. 90.
Cookies with 80% extraction flour. H. F. Schudlich.—p. 92.
Boston brown bread and baked beans. F. P. Graw.—p. 96.

Vol. 86, July 27, 1946

Take home a chicken dinner. H. H. Bierman.—p. 50.
Recruiting and training new employees. J. B. Sparks.—p. 65.

Insecticides. Insect control is not often permanent. Sanitation measures should be taken by bakeries to control the insect pests. In addition certain insecticides are used, of which DDT has proved to be the most popular. DDT has been found to be the most effective insecticide, and has the advantage of being poisonous for a great length of time. The Federal Food and Drug Administration has set low tolerances for the insecticide. Precautions are given in detail for the safe use of DDT, and should be followed accurately.

BUILDINGS AND BUILDING MANAGEMENT

Vol. 46, August, 1946

* Does your cleaning department need reorganization? J. Paressidi.—p. 19.
* Influencing worker attitudes favorably. E. Mottershead.—p. 34.

Cleaning Department Reorganization. To remedy high cleaning costs and poor cleaning results, it may be necessary to reorganize the cleaning department. The first step is to establish square foot areas throughout the building and to determine time allowances for cleaning each of them. Then the cleaning superintendent can select a charwoman and supervise her cleaning of one of the departments. This test will present an accurate record of the time necessary to clean a certain area. Then he can assign that area to a regular charwoman with confidence that he is not asking too much. This method is long, but pays dividends, for it removes an unequal distribution of work. The cleaning superintendent will know whether he has sufficient help and can take steps to correct the problem. After reorganization, good supervision is of major importance.

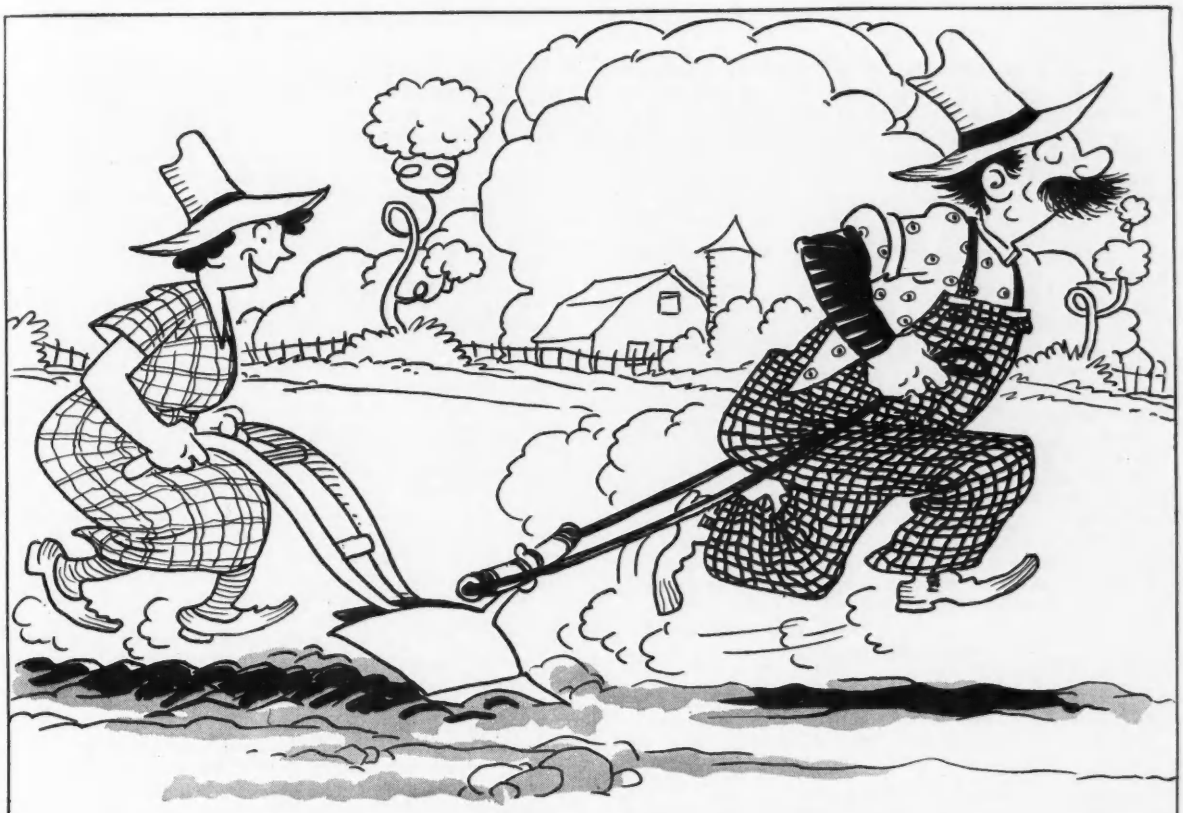
Worker Attitudes. Before management can begin to create favorable attitudes among the workers, they must determine the attitudes for certain sets of circumstances. Management wants the workers to start on time and not stop until quitting time. It demands loyalty and honesty and hopes that the workers will stay for many years. Employees are motivated by the desire for gain and for recognition. They want to feel that they are serving a useful purpose and that they will gain recognition and approval in doing what they consider to be useful. An educational program should be undertaken to develop in the workers an understanding of the usefulness of their jobs and also to develop in the supervisors the understanding that the workers are individuals.

CHAIN STORE AGE

Vol. 22, August, 1946

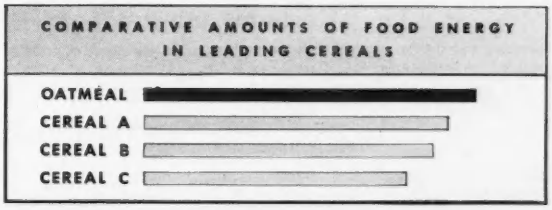
* Keystones of public relations. H. E. Martin.—p. 9.
* How chains are cutting costs.—p. 23.

Public Relations. Jacob E. Davis, vice-president of the Kroger Company, has stated that building community good-



IT'S A FACT! Whole-Grain Oatmeal is Recognized As the Richest Cereal-Source of *FOOD ENERGY!*

Yes! Whole-grain oatmeal, Quaker Oats, leads all cereals in Food-Energy, so important for a full, active life! Quaker Oats has an important place in the dietaries of infants, growing children, teen-agers and adults—including people in later years. In addition to Food-Energy, authorities agree that oatmeal leads all natural cereals in Protein, Vitamin B_1, and Food-Iron. (For more information on these facts, send for the Free booklet, "Why Oatmeal?")



FREE! *"Breakfast Menu Planner"* packed with ideas for unlimited variations in breakfast. Youngsters learn about well-balanced breakfasts—their mothers appreciate the menu suggestions. Write to Mary Alden, The Quaker Oats Company, Home Economics Dept., 223 W. Jackson Blvd., Chicago 6, Illinois.

Quaker Oats and Mother's Oats Are The Same

Quaker Oats

The World's Best-Tasting Breakfast Food

will and understanding begins with the store manager. The store manager must be backed by management and help should be given him in participation in welfare activities and general civic progress. Millions of consumers do not hear much of the work chains have done in the distribution and service fields for the benefit of the consumer, but they are conscious of community backing by stores.

CONSUMER'S GUIDE

Vol. 12, August, 1946

* Eat and let live.—p. 6.

Food Conservation. By wise choice of recipes and buying habits, America can eat well and yet save scarce food for the starving. Potatoes are plentiful and should be substituted for flour whenever possible. Some potato recipe suggestions are potato pancakes, shepherd pie, eggs baked in potato cups, and potato stuffing for chicken. Potato stuffing may also be used in meat roasts, but the outlook is that poultry, particularly turkey, will be in better supply this month than will meat. With the relative scarcity of meat, fish is a good choice for the table, provided it is prepared properly. Fish should be simmered and never boiled. Cooking liquids, such as plain salted water, acid water, or court bouillon will give extra flavor to fish.

FOOD INDUSTRIES

Vol. 18, June, 1946

Food muddle grows worse. L. V. Burton.—p. 71.
What are employee relations? A. R. Cook.—p. 73.
What constitutes an adequate sample. M. S. Anderson and C. W. Whittaker.—p. 83.
* Debunking a color theory. A. Harsham.—p. 85.
Evaluating screw conveyors for materials handling. D. O. Mocine.—p. 86.
Salmon canning.—p. 90.
Using DDT for fly control. L. A. Sandholzer and J. M. Lemon.—p. 94.
High frequency heating produces mold-free bread. W. H. Cathcart.—p. 98.
* How to buy poultry. I. L. Williams and B. W. Gardner, Jr.—p. 106.
Quality grades are essential for frozen food packs. G. A. Fitzgerald.—p. 108.
* New packages and products.—p. 114.
* Food equipment news.—p. 168.
* Storage of dried fruits.—p. 198.
* Color changes in eggs.—p. 198.
* Bacteria, fat, and vitamins in goats' milk.—p. 200.
* Control of rancidity in stored fish.—p. 202.
* Soy flour in baking.—p. 206.
* Drying whole milk.—p. 208.

Vol. 18, July, 1946

Selecting and storing potatoes to avoid darkening.—p. 77.
Pack-coding avoids grief. M. Mergentime.—p. 80.
* Bad beans given the "bounce."—p. 97.
* New packages and products.—p. 110.

Vol. 18, August, 1946

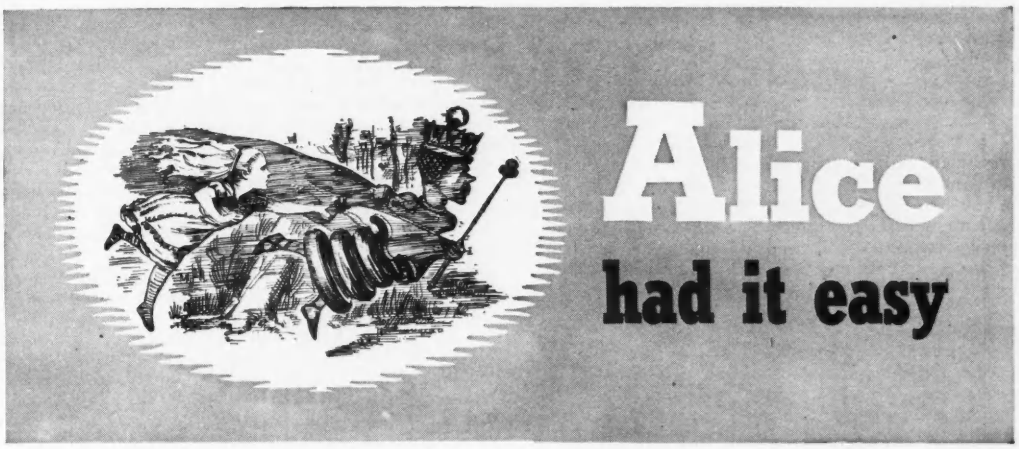
Defects of price control. L. V. Burton.—p. 77.
"Shelf" curing of cheese—what are the facts? A. B. Erekson.—p. 81.
Are food identity standards assets or liabilities? F. N. Peters.—p. 84.
* Folic acid takes its place in the vitamin B series. H. Gee.—p. 90.
Statistical control of the production process. A. M. Mood.—p. 93.
* Are prepackaged frozen meats ready for the retailer? F. W. Specht.—p. 96.
Rapid method for determining fat content of dried eggs. C. Paley, S. Rubin.—p. 98.
Future of frozen foods depends on proper packaging. A. P. Dearing.—p. 100.
How scale prevention cuts bottle washing cost. P. E. Piper.—p. 102.
* New research laboratory will aid the food processor.—p. 104.
Top icing for perishable loads.—p. 106.
* Enzyme activity—index of quality in frozen vegetables. M. A. Joslyn.—p. 108.

Color and Flies. For many years it was believed that flies were repelled by yellow wrappers and that packages wrapped in foil would never become fly-speckled. Therefore, a study was made to determine the effect of different colors on packages on fly attraction or repulsion. Tests were conducted in a Peet-Grady Chamber in which were placed seven packages wrapped in identical type paper varying only in color. Colors selected were purple, light yellow, lime green, dark yellow, orange, strawberry red, and light red. The other two packages were foil wrapped. All packages were subjected to 500 flies for 48 hr. in the chamber. The results were obtained by counting the total number of fly specks on each package and observations were made periodically to ascertain the relative number of flies on the different packages. The data demonstrated that yellow packages do not repel flies, and that no color used in the study was free of fly specks. Foil wrapped packages attracted flies more readily than any of the colored packages, but fewer flies were seen to settle on the purple colored wrapping.

Buying Poultry. Poultry may be classified into four main groups; namely, the broilers and fryers, roasters, hens or fowl, and miscellaneous category of cocks, stags, and capons. Broilers and fryers are young chickens of either sex, ranging in age from eight to 20 weeks, and weighing from 2 to 3½ lb. Roasters are young chickens of either sex, ranging from five to nine months in age, and weighing over 3½ lb. Hens or fowl consist of mature female birds of any age or weight. The last classification of cocks, stags, and capons include poultry that is used for canning or in specialty products. Each class is available to the purchaser as live, dressed, or eviscerated poultry. Dressed poultry has been killed and only blood and feathers removed. Eviscerated poultry has head, feet, and internal organs removed before marketing. Eviscerated poultry is prepared under the supervision of a government veterinary inspector. Live poultry can be purchased at an advantage if the labor expense is not considered, and dressed poultry costs less per lb. than eviscerated, but considerable waste and work are involved before it is ready for use. The actual cost per lb. of edible meat which includes the meat-covered bones is the most important factor for the purchaser to consider. In purchasing broilers or fryers, figures have shown that the edible meat on eviscerated birds costs 8 cents per lb. more than that of the live bird, and 3 cents per lb. more than a dressed bird. A price comparison of edible meat on roasters shows that 9.6 cents per lb. can be saved by dressing the live poultry as compared with purchasing poultry in the eviscerated form. A lesser saving of 5 cents per lb. of edible meat will result from buying hens or fowl dressed instead of eviscerated. However, none of these above figures take into consideration the cost of labor involved or the time factor.

New Packages and Products. One company is offering ready-to-pop corn packed in fiber container. The container holds 10 oz. and is accompanied by a colorful label. . . .A new pack of party pretzels, manufactured in a variety of designs, has been introduced. The same bakery is also putting out a new pretzel item which is called carmelized cocktail stix. . . .Beans, with sliced frankfurters and tomato sauce, now are available as a canned food. They are packed in 12-oz. cans and each can contains descriptive labeling telling the size of the can, net contents, cups, servings, and directions.

Food Equipment News. A vacuum bottle filler has been developed which will accommodate bottles and jugs ranging in height from 3 in. to 13 in. . . .A high test calcium hypochlorite, has been announced that can be used in the treatment of coolers, bottle fillers, pasteurizers, churns, separators, tanks, and tank cars. . . .Announcement has been made of a powerful cleaning action exerted by heat, water, detergent, and friction, in a portable steam cleaning



We've come to appreciate Alice's feelings in "Through the Looking Glass" when the Red Queen said,

"... it takes all the running you can do, to keep in the same place. If you want to get somewhere else, you must run at least twice as fast as that!"

But we find ourselves in an even more trying predicament.

Production of AMINOIDS* is up more than 100% over last year and still we are not able to keep up with the demand.

We are improving and extending production facilities as rapidly as post-war conditions permit. Meanwhile we are trying to distribute our output as equitably as possible. We hope we shall soon be able to fill every order promptly. Your understanding of our predicament and your continued friendly cooperation will be appreciated.

* The word AMINOIDS is a registered trademark of The Arlington Chemical Company.

THE ARLINGTON CHEMICAL COMPANY

YONKERS 1 Arlington NEW YORK

unit. The unit has three manual controls, varying the temperature, quantity of solution, and nozzle pressure. A variety of cleaning compounds can be used through this unit, and cleaning can be done on both delicate and hard construction surfaces.

Dried Fruit Storage. Moisture and sulfur dioxide affect the color and keeping qualities of dried fruits stored at high temperatures. Both of these factors retard darkening of the fruit, and if not used too highly concentrated, will not alter the flavor of the fruits.

Color Changes in Eggs. Color changes in eggs during cold storage are due to the diffusion of iron from the yolks into the whites and its reaction with conalbumin. The salmon color of yolks is attributed to the diffusion of conalbumin into the yolks, its reaction with the iron to produce a pink color.

Goats' Milk. Goats' milk contains fewer bacteria and less riboflavin, but about the same amount of fat and ascorbic acid as cows' milk.

Rancidity of Stored Fish. The onset of rancidity in flesh of fatty fish can be almost entirely prevented if the fish are stored in the frozen state in the presence of a very high concentration of CO_2 or nitrogen gas.

Soy Flour in Baking. Excellent bread may be made from wheat-soy flour blends, including up to 8 per cent soy flour by the use of from three to five times the quantities of potassium bromate needed for wheat flour alone. The quality of the bread as measured by loaf volume and crumb grain, was even better than wheat flour, providing potassium bromate used in the formula was increased according to the amount of soy flour used.

Drying Whole Milk. Powdered whole milk having better keeping qualities and freedom from oxidation has been discovered. The patented process includes heating skim milk and cream, after separation at 170–180° F. for 15 to 30 min., then recombining the treated portions and drying to a powder.

Bean Sorting. Electronic sorting machines provide a speedy, foolproof, and mechanical means of sorting bad beans from good ones by employing RCA phototubes, cathode ray tubes, and control tubes. Acceptance or rejection of each bean is dependent upon the percentages of red and green light reflected by it. The machine works with peanuts, coffee, seed corn, and potatoes as well as beans.

Packages and Products. Margarine is hermetically sealed in a thermoplastic film bag, stable in the presence of fatty acids and brine. When the package is squeezed the coloring is released and a few minutes kneading gives desired color. . . . A dry combination of bleached wheat flour, baking powder, salt, pepper, powdered egg, powdered skim milk, and certified food color is now being packed in retail containers. When mixed with equal parts of water, the batter is suitable for deep frying sea food, meats, and vegetables. . . . New powdered molasses more resistant to caking, easy to handle, light in color, lacking bitter taste is being packed in 5- and 30-lb. tins as sweetener in desserts, ice creams, confections, and puddings. . . . Pineapple tidbits in 60° sirup are packed in 1-lb. packages protected by wax-coated pouch and carton. . . . Prunes are now packaged and passed through high frequency di-electric field for necessary length of time instead of the customary application of external heat. . . . Precooked chicken à la king is packed in 12-oz. packages. . . . Pliofilm-lined bag for raisins offers protection against moisture loss, moisture pickup, and insects.

Synthetic Production of Folic Acid. Folic acid, the new member of the vitamin B family, has been made synthetically and the structural formula has been proved identical with one of nature's forms. This vitamin is present in fresh fruits and vegetables with green leaves, liver, and yeast having a particularly high content. It has been used in the treatment of pernicious anemia quite successfully. One chemical company has made preparations to manufacture the new vitamin on a large scale.

Prepackaged Frozen Meats. One packer is experimenting with prefabricated, prepackaged, quick frozen meats. If adopted, the plan would bring to the packing houses many of the functions of the retailer. The packer would need much new equipment and a large number of specially trained workers. The final success of this method depends on whether the charges can be adjusted so that the purchaser does not pay more for the frozen prepackaged product than for the fresh product.

New Research Laboratory for Food Processor. The Food Machinery Corporation in San José, California, has built a laboratory to undertake the development of processes and machines that will increase the efficiency of the food processing industry and ultimately lower production costs. There are five major sections including canning, raw products, evaporated milk, food freezing, and sprays. Each section has its own staff of chemists, physicists, and bacteriologists.

Quality in Frozen Vegetables. Enzymes in frozen vegetables that have not been blanched produce flavor changes that are undesirable. By blanching or scalding the vegetables, the enzymes concerned in flavor changes are inactivated. The length of time required for blanching depends on the factors determining heat penetration in that particular item. Enzyme-activity index is given and also the results obtained from testing on various vegetables.

HOTEL MANAGEMENT

Vol. 50, July, 1946

Management's eighth typical hotel study.—p. 39.
Front office layout and procedure.—p. 54.
How the housekeeping department functions.—p. 78.
* How the Castle's kitchen is planned and staffed.—p. 85.
Selling and serving banquets and parties.—p. 88.
* What's new.—p. 96.

Hotel Kitchen. One hotel chain has built its reputation on food of high quality at a selling price that leaves a reasonable profit. The kitchen is highly mechanized with many labor-saving devices. Structural changes to separate the bakery from the main kitchen and to enlarge the salad making unit are underway. The kitchen is electrically operated. The chef makes up the menus, does all the buying and the butchering. There are seldom any leftovers. The present food cost control method arrives at gross and net food cost figures based on a daily report and monthly inventory. Standard purchasing specifications, standard portion sizes, and standardized recipes are not used.

What's New. Both orange and grapefruit juice are now available in concentrated form in various strengths. Besides the savings in labor, shipping costs, and time, the products are available all year long. They should be kept at fairly low temperatures or refrigerated. . . .A new metal cleaner removes tarnish, corrosion, and rust on brass, chrome, copper, monel, steel, aluminum, and other metals with no effort. It washes off easily and does not injure surfaces.

HOTEL MONTHLY

Vol. 54, June, 1946

* Advance employees on merit; not on ability to "holler."—p. 47.
How an attractive buffet supper is produced.—p. 49.
"Training supervisors in human relations."—p. 71.

Vol. 54, July, 1946

What are your problems in hotel personnel management?—p. 12.
DDT now available in adhesive coating form.—p. 18.
Cheat the garbage can to save millions of lives.—p. 58.

5 reasons why bananas belong in geriatrics

1. Easy to Digest
When a banana is fully ripe, practically all its starches have been converted to readily digestible fruit sugars.
2. Richly Protective
Bananas have a well-rounded supply of vitamins and minerals. They are one of the better sources of Vitamin C, a good source of Vitamin A, and contain significant amounts of the B Vitamins and important minerals.
3. Mildly Laxative
The soft fiber, pectins, organic acids, and vitamins of fully ripe bananas assist in maintaining the tone of the intestinal tract.
4. Easy to Chew
Bananas are not only easy to chew and digest, but supply important food elements frequently lacking in "soft" or "liquid" diets.
5. Satisfy Sweet Tooth
A ripe banana contains the equivalent of 5 teaspoons of readily digestible fruit sugars—an easy way to satisfy that craving for something sweet.

Important!

Fully ripe bananas are best for eating at any age. A banana is fully ripe when its yellow peel is flecked with brown.

FRUIT DISPATCH COMPANY

Merit Rating. To make possible the operation of a merit system, management must first have a desire to have a merit basis as management policy and second vest proper authority and responsibility in those who are to administer the merit system. Since one of the advantages of the merit system is hotel-wide opportunity for promotion, the rating system must provide also for a definite sequence of promotion and for a normal line of progress. Before this, a desire must come on the part of management to have progress and a system to make such progress possible. Opinion is the most relied-upon tool in rating. Ratings to be used for control purposes are obtained more easily and just as accurately by testing the traits of an employee as a unit, rather than breaking down and evaluating traits separately. How well he does his job is the question. Divide employees into smaller groups of similar work and interest, choose as testers persons acquainted with employees. Strike the average rating of the group and compare each individual with the group average. Do not use specific figures for comparison, but the upper 10 per cent, upper one third, or lower 10 per cent. Final decision should rest on how the employee rates in the opinion of most people.

THE ICE CREAM TRADE JOURNAL

Vol. 42, June, 1946

Efficient operation of evaporators in ice cream plants. C. H. Minster.—p. 39.
* Manufacturing problems. P. H. Tracy.—p. 48.
* The use of processed nuts, fruits, and other flavors. E. C. Wetmore.—p. 56.

Vol. 42, July, 1946

Ice cream sales at specialized frozen food stores. V. M. Rabuffo.—p. 26.
* Principles of ice cream making. P. H. Tracy.—p. 34
* Butter oil as a source of fat for ice cream. B. I. Masurovsky.—p. 54.

Manufacturing Problems. Here is given the exact caloric value of one specific ice cream formula. Also included is a formula for 14 per cent ice cream using sweetened condensed whole milk and 22 per cent cream, and a formula for frosted malted mix using sweetened condensed milk.

Using Processed Fruits and Nuts. Many fruits are now being processed where grown so that they are prepared at the right stage of ripeness when the fruit contains maximum flavor for use as ice cream flavorings. These fruits are packed with a minimum amount of sugar and pasteurized after being placed in the final container. Nuts are roasted crisp and then siruped to preserve them and keep them sterilized. The chocolate, coffee, root beer, and other flavors used in ice cream are now uniform in quality, absolutely pure, and have taken years to perfect.

Ice Cream Making. Ice cream manufacture involves the selection of ingredients, the processing of these materials, the flavoring and freezing of the mix, and the packaging and hardening of the ice cream. Fresh cream is the most desirable source of butterfat. It is responsible for the whipping quality and the flavor. Butter is used to supply a portion of the fat, but does not whip as well as fresh cream mixes. Butterfat is also used and it has good keeping quality. Milk solids that are not fat add flavor to the ice cream and give body and nutritional value to the ice cream. Such products are: concentrated skim milk, superheated condensed milk, and sweetened condensed skim milk. The superheated condensed milk improves the mix whipping and causes the ice cream to have a better body. The sweetened condensed skim milk also gives body to the ice cream, as well as improving the mixing quality. Since the added sugar is present, it acts as a preservative and will keep the milk for some time without spoiling. Dried skim milk is a product commonly used in ice cream. It has good keeping qualities and may be stored conveniently. A stabilizer is added to the mix to improve the body of the ice cream. Gelatin is the most usual stabilizer. Ice cream mixes need to be standardized to insure uniform composition.

Butter Oil. Butter fat is responsible for the palatability and creamy flavor of ice cream. The main sources of butterfat are: sweet cream, frozen cream, high grade butter, and butter oil. Butterfat helps give the smoothness of body and texture to finished frozen ice cream. Butter oil contains from 99 to 100 per cent butterfat, depending upon the method of its manufacture or process employed in its preparation.

INSTITUTIONS MAGAZINE

Vol. 19, July, 1946

Properly designed kitchens a rarity, authority asserts.—p. 1.
* Points to consider when you purchase aluminum utensils.—p. 3.
Practical tips on preparing pies to be frozen, baked.—p. 17.
A new bactericide '1622' is a grim pursuer of germs.—p. 19.
Fluorescent lamps predicted in more tints, shapes, sizes.—p. 53.
* 21 causes of food poisoning pointed out by authorities.—p. 81.

Purchasing Aluminum Utensils. There are two general types of aluminum utensils—the cast and the stamped. Castware is made directly from ingots of a suitable alloy, and the metal is poured into forms, called molds or dies. Drawnware is made from alloy that has been rolled into flat sheets. Some distinguishing characteristics of the two types are that castware tends to be relatively thicker and heavier in weight than drawn aluminum; there is greater variation in the fittings used on the various grades of drawnware; cast aluminum is considered better adapted for surface cooking, whereas most aluminum baking and roasting pans are of the drawn type. The thickness of cast aluminum is usually graduated, while drawnware tends to be uniform. Prices of castware and heavy drawn are about the same; however, the average prices on castware tend to be higher. Thickness or gauge is more of a factor in determining grade for drawnware than for cast.

Causes of Food Poisoning. Flies, fingers, and food are the major factors involved in the control of communicable diseases which can be acquired in food establishments. Twenty-one sources of contamination outlined by the Burke-Ward Health Unit of Minot, North Dakota, in the instruction course for food service personnel, are as follows: improperly washed vegetables; contamination by carriers of disease; contamination by employees due to unclean hands after visiting the toilet; contamination by rats, flies, and roaches; contamination by infections; contamination by customer; contamination by waiter or waitress; improper use of hand towel; contamination of food by sewage; contamination of drinking water; use of uninspected meats; inadequate cooking of foods; uninspected or ungraded milk; improper storage and dispensing of milk; improper handling of pies and other pastries with cream fillings; improper handling of commercially prepared sandwiches; improper use of cracked ice; use of uncertified oysters; and improper refrigeration.

PERSONNEL JOURNAL

Vol. 25, June, 1946

* Personnel philosophy. L. K. Johnson.—p. 42.
Pity the poor planner. A. O. Mann.—p. 50.
* Labor turnover studies. F. R. Clarke.—p. 55.
The factory mind. E. J. Redmon.—p. 59.
Training of non-academic employees. D. E. Dickason.—p. 62.
To test or not to test. L. Cohen.—p. 72.
"The psychology of personnel." Henry Beaumont.—p. 76.

Personnel Philosophy. Failure of some personnel programs since the war to gain confidence and cooperation of

• Pay a compliment to good food, make a pledge to good health! You do both when you set your tables with Super-Soilaxed eating utensils. Because china, glass, silver washed with Super Soilax have super-sparkle *and super-safety!*

The powerful cleansing action of this dish-washing compound purges utensils of eggs, coffee stains, stubbornest food residue. Most important, Super Soilax — unlike many dishwashing agents — creates no film-forming precipitates of its own. Utensils come through gleaming clean—undulled by film that steals sparkle, harbors germs, helps spread disease!

Protect your patrons with immaculate utensils. Good food deserves them, good health demands them! Use Super Soilax and Super Soilax Service — you'll be sure of more-than-visible cleanliness and lower bacteria count per utensil. *Economics Laboratory, Inc., St. Paul, Minn.*

SUPER SOILAX

For mechanical dishwashing of china, glass, silver EL

the worker is in many cases due to unsound psychological foundation. Personnel procedures have not always been supported by consistent personnel philosophy. Haste has at times been the cause of labor strife when programs were built. Positive leadership with the right attitude of fairness is not always understood or carried out by management. Modern personnel philosophy provides that actions take into consideration the effect of such actions upon feelings and emotions of workers. In addition to protecting workers against accidents, sickness, death, old age, and unemployment, modern personnel philosophy attempts to provide protection against mistakes and inefficiencies of management, which would cause workers to lose time because of lack of raw materials or defective equipment. The thought is that management will give the workers or their representatives the right to full and open discussion of all personnel plans, policies, and procedures. Having developed an underlying philosophy, management needs to have objectives in developing a personnel program. Next consider what is to be done, then how, where, when, and who is to be responsible. A personnel program requires continuous attention and constant application of effort to gain the loyalty and cooperation of employees. Too few executives are willing to devote the time and effort necessary to achieve the desired results.

Labor Turnover Studies. Labor turnover costs are expensive as figures of $180, $227, and $127 for different companies show what it costs to replace a man. In labor turnover, factors other than wages have been shown to be more important in the minds of the workers. Study during the war showed more than twice as many people resigned as were discharged from one company. Half the resignations took place during the first year of service and 40 per cent of these during the first three months. Women under 20 and men under 30 years of age were more unstable. Two main factors governing turnover were the plant policy and the interpretation of the policy by the foremen. Small groups working with the foreman gave better results than larger groups. A high degree of absenteeism was usually a forerunner of increased turnover. In a study of foremen voluntarily attending special classes it was noted that in the group of foremen with perfect attendance and high interest, 67 per cent were in the low turnover group with 22 per cent in the high turnover group. In those sections of foremen who had poor attendance and did not attend the courses, 33 per cent were in the low turnover group and 40 per cent in the high turnover group. This would tend to show the importance of foreman training in relation to low turnover.

RESTAURANT MANAGEMENT

Vol. 59, July, 1946

Money making methods. F. Searing.—p. 29.
* Why we are using brighter, lighter colors in keeping our restaurants up to date. J. Goumenis.—p. 31.
Specific recipes for hiring and training. S. H. Devine.—p. 34.
Basic principles of quantity cookery. A. Easton.—p. 36.
Fabulous food facts. B. Ritter.—p. 39.
How an old ferry boat was made over into a successful restaurant. C. E. Colpaert.—p. 44.

Inviting Atmosphere. A restaurant proprietor recently redecorated his establishment with an eye to the psychological effects of his customers and his employees. The color combination was changed, mirrors were installed, and more booths were added. The bar was left for the people desiring this quick service. The uniforms of the waitress were designed to tie in with the color scheme of the restaurant. Wired music was installed. Throughout the meat crisis, a fairly large amount was still offered on the menu. The manager and chef work closely together in planning menus and buying. Only food needed for immediate use is bought. The menu is planned for color and combination, and is changed frequently. Waitresses are instructed on how to serve a guest the correct way. The entire remodeling expense was $10,000. The manager feels people like variety and change and will do it again if it is necessary to keep up with the times.

WHAT'S NEW IN HOME ECONOMICS

Vol. 10, July, 1946

The ancient and honorable cheesecake. C. B. King.—p. 8.
* Fruit—fish—flowers via airplane. C. Sherman.—p. 10.
How valuable is a food record? D. Golding.—p. 17.

Airplane Shipment. With the airplane increasingly used for commercial purposes, we may soon look forward to having luxury fruits on our tables. Some growers' associations are considering installation of processing and chilling plants near the airports, so that juice extracts may be shipped directly from nearby orchards. Spinach and cauliflower may be washed near the airports and packed ready for immediate shipment. Peas and Lima beans may be shelled before they leave the fields. Interesting sea food from Florida and flowers from California can also be expected by air shipments.

Dialyzed Milk

A QUART OF milk contains over 0.5 gm. of sodium which must be removed if it is to be used in a sodium-restricted diet. This can be done by placing regular milk in a semi-permeable membrane around which a steady stream of water circulates. For this purpose, visking tubing (obtainable from the Visking Corporation, Chicago) may be used. One end of an approximately 5-ft. length of tubing is tied off and the milk introduced through the open end, which is then also tied and the filled tube placed in a cylinder through which water circulates. Dialysis must continue for approximately 48 hr., and the circulating water must be maintained at a low temperature in order to avoid spoilage. A dried milk powder which has been freed from its sodium content has been prepared commercially. However, this is available at present only for experimental trial and is not on the market.—*From Queries and Minor Notes, J. A. M. A., 131: 366, 1946.*

Dietitians find it a key to finer flavor and better nutrition

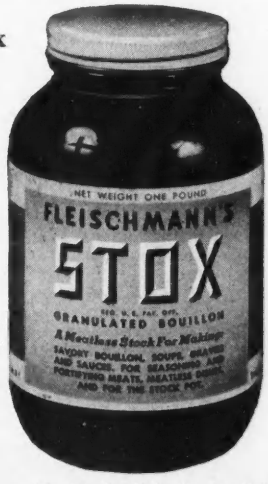
***STOX BOUILLON** is easy to use—dissolves almost instantly—works a miracle of flavor—and provides extra B vitamins*

• Dietitians everywhere find Stox a wonderful aid in menu-building.

Although it contains no meat, this granulated bouillon has a hearty meat-like flavor that adds savor to soups, sauces, gravies, aspics, meat dishes and vegetables. It enables you to give meatless dishes an appetizing, meaty flavor—plus extra vitamin values.

Ease of preparation is another point that wins praise for Stox. It dissolves in a moment to make a rich soup base or an instant clear bouillon that is an appetizing "pickup" both at meals and between meals.

Once you use Stox in your menus, it will stay there.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GRANULATED BOUILLON
A Meatless Stock For Making
SAVORY BOUILLON, SOUPS, GRAVIES AND SAUCES, FOR SEASONING AND FORTIFYING MEATS, MEATLESS DISHES AND FOR THE STOCK POT.

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News Notes

Graduation of Student Dietitians. On June 28, at Johns Hopkins Hospital, Baltimore, graduation exercises for 17 student dietitians were held. Dr. Edwin L. Crosby, director of the hospital, gave the diplomas to the young women. Members of the graduating class were: Alice L. Beardsley; Liana Cernoia; Doris Driggs; Jane Harrell; Louise McKenney; Jeanne Neale; Martha Lee Riggs; Elizabeth Stenborg; Celia Whitney; Elizabeth Manthey; Dorothy Miller; Dorothy Bemis; Judith Gold; Helen Murray; Marion Moulton; Virginia Wells; and Kathryn Wells.

New Course for Hospital Administrators. The University of Minnesota has announced the establishment of a new course in hospital administration which began in September. The Kellogg Foundation has awarded the university an original grant of $20,000 for the first year, with an agreement to make similar grants for the two years following. Prospective hospital administrators will be required to complete two full academic years of study, including one year of actual course work and one year on an internship basis in a hospital. Completion of the course will lead to a master's degree.

Hill-Burton Hospital Construction Survey Law. This law, signed by President Truman on August 13, provides $375 million in federal funds to be apportioned to the states on the basis of need for hospital facilities as determined by an inventory of present hospital beds. The measure carries a separate appropriation of $3 million to assist states in conducting surveys, drafting plans, and designating where and what types of facilities are necessary. The American Hospital Association reports that surveys are already underway in 40 states, seven are organizing surveys, and only one (Missouri) has not yet taken action. Surveys will be completed in at least 11 states by October 1.

Harvest Festivals. The Famine Emergency Committee has urged the mayors of 3,000 cities to mobilize civic leaders to hold harvest festivals to climax the 1946 home garden and food preservation activities. These programs may be staged through October. Paul C. Stark, executive director of the FEC, says: "We want to emphasize again the importance of these harvest festivals in stimulating and encouraging continued interest in late gardens and a maximum amount of home canning which means so much. . . . The National Garden Institute will furnish free of charge a certificate of award for the person selected as top winner in each local harvest show. These awards are in addition to the trophy award to be furnished to the woman selected as state canning champion in each participating state. These trophy awards, furnished by the National Garden Institute, will be awarded in many states to the canning champion selected by State Extension Service."

Youth Food Conferences. The program outlined by 17 young people's organizations working together as Youth United for Famine Relief included the calling of youth food conferences in every county in the U. S. during or before September 23. Such conferences were designed not only to bring home to all parts of the country the reminder that above-average hunger will persist throughout the world even after the harvest, but that the obligation to save food remains. In many cities, the Councils of Social Agencies sponsored plans for these conferences. Aid in conducting such meetings was supplied by the local Famine Emergency Committees.

New Price Control Act. Special provision is made in the new OPA law for consumers to "present their views orally and in writing" on the decontrol of specified commodities. This places a definite responsibility on consumers. The local Price Control Boards will continue to need assistance, not only in getting community-wide understanding of the price control job, but in watching prices and reporting overcharges. Because of the sharply reduced appropriation to OPA for the coming year, such community cooperation and action is increasingly important if the new law is to be effective. Members are urged to cooperate in this respect whenever possible.

Training Manual for Chief Cooks, Cooks, Bakers, and Meat Cutters. The Dietetic Section of the Veterans Administration Hospital, Hines, Illinois, under the direction of Kathryn A. McHenry, chief, has prepared a revised edition of its training manual. Prepared in outline form and mimeographed, it includes practical assignments which can be carried out on the job simultaneously with class instruction. A number of accomplishment charts for rating achievement have been included which accompany the trainee upon assignment to duty and are kept by his supervisor for a minimum of one year while on-the-job training is being continued. There are also summary charts for both meats and vegetables calling for records of preparation, time, yields, methods, and cost breakdowns. Outlines for a particular job follow the topics of equipment, temperature control, preparation, methods, supplies, and so on, according to the subject discussed.

New Bulletin. The first issue of a new monthly bulletin was published in September by the National Society for Medical Research. Its purpose is to chronicle news events affecting research in the biological sciences. Two new members have been added to the information staff of the Society: Gene Kohner will specialize in public education techniques, publications, and publicity, while Edith Sperling will serve as writer and editor.

National Chemical Show. From September 10–14, the National Chemical Exposition was held in the Coliseum in Chicago in conjunction with the semi-annual meeting of the American Chemical Society. More than 200 exhibitors took space at this show, and displays covered the entire field of chemical products and processes. A special exhibit was set up to show the work of the National Roster of Scientific and Specialized Personnel of the War Manpower Commission.

Exhibits of Physicians' Art. The Eighth Annual Exhibition of the American Physicians Art Association was held in War Memorial Opera House, San Francisco, July 1–5. This exhibit, sponsored by Mead Johnson and Company, included more than 700 works by physicians from all over the country. More than 180 awards were given. Simultaneously the First Annual Exhibit of the American Physicians Literary Guild was held, with more than 80 unpublished manuscripts on view, including poetry, essays, short stories, and plays.

Announcement has been made by Mead Johnson that the closing date for the 1947 competition of physicians' art will be May 15, 1947. The exhibit next year, for which awards totaling $34,000 will be offered, will be held at the Atlantic City Centennial Session of the American Medical Associa-

Announcing.. A NEW TRIUMPH OF FOOD SCIENCE

Remarkable New KC adds Important Food Value

Betters Bakings 3 Ways!

Here's first news of a new development that can be justly called, "The greatest baking powder improvement in 50 years!" It's the new K C improved with FOOD CALCIUM for:

Better Looking Bakings . . . Biscuits, Cakes, and "Hot Breads" made with new K C have lighter, smoother overall texture—much more inviting appearance. . . . Due to FOOD CALCIUM in the improved formula, the active ingredients in the new K C are more evenly distributed throughout the powder. This promotes more uniform action with amazingly improved results.

Better Taste . . . FOOD CALCIUM in K C prevents the "overpowering" of the rich natural flavor of other ingredients in your bakings. There's no bitterness or "Soda Taste" when you use the new K C.

Better Nutrition . . . Milk has long been recognized as a good source of CALCIUM, yet the new K C adds *2 to 5 times more CALCIUM* to a baking *than the fresh milk* you use in the recipe. This makes everything you bake with K C a valuable source of the food element authorities have proved is so necessary in building and maintaining strong teeth and bones.

Dietitians: Be sure to send in the attached coupon. And be sure to visit our booth at the convention. Its number is 459. We'll be looking for you!

Attention, Dietitians!

Mail this Now!

Double Action **KC** BAKING POWDER

JAQUES MFG. CO., Dept. F, 111 W. Jackson Blvd., Chicago, Ill.
I would like to take advantage of your offer of a free sample of the new K C Baking Powder Improved with Food Calcium. Please mail to address below.

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I have charge of the diets of (number) ..... *persons.*

tion at Atlantic City, June 9–13. The theme will be "Courage and Devotion Beyond the Call of Duty." Art works on other subjects may also be submitted for the regular cups and medals.

Famine News. An uncomfortably low world food supply is in prospect next year, according to reports from the USDA. Although crop conditions and food production throughout the world will probably be good, carry-over stock will be at a low level. In general, the situation will be: wheat—a considerably larger supply in 1946–47; rye and rice—probably above last year's short crops, but considerably below prewar; sugar—somewhat larger crop: edible fats and oils—continued inadequate supplies; meat, dairy products, and eggs—smaller supplies.

It has been announced that relief shipments of fats and oils to foreign countries will end December 31. The decision was made in an attempt to bring U. S. supplies in line with domestic requirements during the coming year.

Following negotiations with UNRRA, it has also been announced that substantial cutbacks are being made in food purchases for that agency, as the agency needs to use its remaining resources to buy cereals and other cheap, but high-caloric foods. In general, the cutbacks affect the relatively higher cost items, principally meat and dairy products. However, UNRRA is still trying to obtain as much bread grain and fats as possible, and general procurement of these items will not be cut, except in certain specific instances.

Only about 60 million lb. of canned meat were delivered to UNRRA during July, August, and September, instead of the original 88 million lb. called for. A cutback of 25 million lb. of dairy products—dried milk, cheese, and canned milk—also has been effected. All requisitions for dry edible peas for UNRRA have been cancelled. With the exception of one outstanding requirement for 10 million lb. of ground fish, no more canned fish will be provided for UNRRA, and even the ground fish requisition will be cut if possible.

The September export program for grains and grain products for direct consumption called for shipment of 598,000 tons of wheat: 380,000 tons of flour (in terms of wheat equivalent); 62,000 tons of meats; and 17,000 tons of grain sorghums. This total included 234,500 tons for UNRRA countries; 224,000 tons for India; 113,500 tons for the United Kingdom; and 78,000 tons for the British Zone in Germany.

The allocation for India was a substantial increase over shipments during recent months, and was urgently needed in the face of a threatening food crisis during October and November. Grain from India's new rice crop will not begin to become available until early in November. Even with the large allotment from the U. S., supplies may not be sufficient to maintain even the present low ration in that country and in any case additional supplies will be needed from other countries.

Contracts have been drawn with the United Kingdom for the purchase of 11 million lb. more dried whole eggs.

Food Supplies. The provision requiring 80 per cent extraction of wheat flour, instead of the usual 72 per cent, was terminated on September 1. However, limitations on the quantity of flour which may be produced for domestic distribution (85 per cent of 1945 volume) and restrictions on the use of wheat for other food and non-food purposes are being continued. An announcement has also been made to the effect that consumers may feel free to buy ready-to-eat cereals in any quantity desired if the foods are on the grocers' shelves.

The 1946 corn crop has been estimated at 3,442,202,000 bu., 13 per cent more than the 1945 crop, even though dry weather around the Great Lakes and the Plains States caused a reduction estimated at 55 million bu.

A good supply of fall apples is expected this year and a bumper crop of honey dew melons. There is a large carry-over of turkeys, which means there will be ample supplies on the market. A good supply of poultry of all kinds is in prospect. Eggs should be plentiful with near record stocks of storage shell eggs on hand. Cheese, particularly soft cheese, will probably be more plentiful than last year, but evaporated milk will still be in short supply.

Continuing scarcities of fats and oils is anticipated, with 600 million lb. less during 1946–47 than during 1945–46, despite decision to end relief shipments on December 31 because of domestic needs. Fish will continue to be plentiful because of large stocks of frozen fish and seasonally heavy landings of fresh fish.

Extremely plentiful foods will be potatoes, carrots, onions, lemons, and canned citrus juices. Actually, the potato crop is expected to be so large—445 million bu.—that special marketing campaigns will probably be needed to induce consumers to use more potatoes. It has been reported by USDA that the annual per capita consumption of potatoes is 1 lb. lower than in 1945 and 3 lb. lower than the average for 1935–39, and that unusual sales efforts must be employed in order to reverse this trend. Two leaflets containing recipes using potatoes and stressing their nutritive value are available from the Chicago Nutrition Association.

A similar problem of surplus is faced with onions. Total production of early and late spring and early summer onions is 3,334,000 bags above that of 1945.

It has been announced that none of the 1946 pack of canned Atlantic sea herring, including Maine sardines, and no canned Pacific mackerel will be set aside for government agencies. This means that an estimated 575,000 cases of Maine sardines and 361,000 cases of canned mackerel will be available to civilian consumers—a 45 per cent increase in estimated civilian supply.

News of State Associations

Illinois Dietetic Association. *Belle Hoffman* has left Cook County Hospital for a position with Sky Chefs, Inc.

Iowa Dietetic Association. The *Quad City Dietetic Association* is headed by *Enid Miner* of Moline Public Hospital. Mrs. Miner is a graduate of the School of Home Economics at Iowa State College. The group averages about eight meetings a year, with regular attendance of 10 members. At a recent meeting, Lynette Gatten spoke to the group on "The Dietitian in the Hotel Field."

Dorothy Johnson was recently married to Maurice Kalen and expects to live in Ames. *Mildred Torrance* has resigned her position as dietitian at the Methodist Hospital, Des Moines. *Esther Wibholm Raney* has joined the nutrition staff at Cherokee State Hospital, Cherokee. *Patricia Whisler* has purchased a tea room in Estes Park, Colorado and opened for the season on May 19. It is named "Whisler's Inn." *Katherine Boyd* is now pediatric dietitian at Children's Hospital, Iowa City. She was formerly at Children's Hospital, Denver. *Grace Huglin Verburg* is therapeutic dietitian in Southern Pacific Hospital, San Francisco. *Bonnie Jean Nole* has been appointed dietitian at Pittsburg Community Hospital, Pittsburg, California.

Maryland Dietetic Association. *Mr. and Mrs. William Boerner (Martha Hindman)* are parents of a daughter, Jane Anne, born August 2 at Johnstown, Pennsylvania. *Mr. and Mrs. Charles O. Bracken (Felisa Jenkins)* announce the birth of a son, Charles Oliver, born June 3.

Minnesota Dietetic Association. *Margaret O'Brien* has joined the dietary staff at St. Marys Hospital as surgical dietitian. On July 15 a new class of 17 women from 11 states became student dietitians in training at St. Marys Hospital.

Missouri Dietetic Association. *Helen E. Struble* has been appointed editor of *Missouri Mutterings* to succeed *Helen McLachlan* At the May 6 meeting of the Association, Dr. Carl V. Moore, associate professor of medicine, Washington University, St. Louis, gave an address on "The Role of Folic Acid in Human Nutrition," which has been summarized in the state bulletin. At the meeting of the

Bright way to start the day!

this delicious dish
of wholesome whole wheat

Watch your patients perk up when they see Nabisco Shredded Wheat coming their way! Golden-good to eat with its rich, ripe flavor of the natural whole wheat – loaded with the solid, satisfying nourishment that many patients need. It's just naturally a better breakfast – pure whole wheat simply steamed, shredded, baked! Make it a practice to serve Nabisco Shredded Wheat – the original Niagara Falls product – and start the day off bright!

Delicious, ready to serve ...
yet as nourishing as a hot cereal

Executive Board on May 4, plans for the state convention to be held in Kansas City in November were discussed. It was decided to invite the Kansas Dietetic Association to join the Missouri dietitians at this meeting. *Elva Ottman*, until recently with the Children's War Service Program, Kansas City, has been appointed vice-president of the Association to succeed *Mary Reeves*.

Dorothy Jaynes has received an appointment at General Hospital No. 1, Kansas City. *Esther Burgett* is now at St. Mary's Hospital, Kansas City. *Margaret Pettyjohn* is also in Kansas City working for the Myron Green Cafeterias. Until recently she was employed by Procter and Gamble, in Milan, Tennessee. *Phyllis Benefiel*, formerly at Beth Israel Hospital, Boston, has joined the staff at St. Luke's Hospital, Kansas City. *Eula Tombaugh*, formerly with St. Luke's, has gone to Samaritan Hospital, Nampa, Idaho. Ellen Tyler recently joined the staff of the University of Kansas Hospitals, Kansas City. *Lora Jean Woolsey*, formerly with Kansas City Dairy Council, is now dietitian at St. John's Riverside Hospital, Yonkers, New York. Announcement comes from *Mrs. Mildred Barnett* in Indianapolis of the birth of a son, Glen Ellis. Mrs. Barnett was formerly connected with the Kansas City Tubercular Hospital.

Marge Graebner, head dietitian for the past nine years at Deaconess Hospital, St. Louis, has been extended a year's leave of absence to serve with UNRRA in Germany. *Margeret Els* is a new therapeutic dietitian, Deaconess Hospital. At St. Louis County Hospital, *Frances Gillespie*, who was separated from the Army in May, has been appointed assistant dietitian. *Mary Catherine Downs*, formerly at Missouri Pacific Hospital, is now on the staff at Barnes Hospital, Food Clinic, St. Louis. *Adeline Belko* has joined the staff at Alexian Brothers Hospital, St. Louis. Also in St. Louis, *Jean Wolfe*, formerly at Indianapolis City Hospital, is now assistant dietitian at Missouri Baptist Hospital. *Myra Jean Azbe* has joined the staff at Firmin Desloge Hospital, Food Clinic, St. Louis.

Nebraska Dietetic Association. *Mary Hartquest* has joined the staff at Bryan Memorial Hospital, Lincoln, as dietitian. *Inez White* has resigned as food director at the University of Nebraska's Student Union Building. She is succeeded by *Rosa Knickerum*, former assistant food director. *Wanda Jean Wright* will become the new assistant food director. *Thelma McMillan* will be instructor in foods and nutrition, and assistant in the research department at the University of Nebraska this fall. *Dr. Ruth Leverton* has been appointed head of the Foods and Nutrition Division of the University of Nebraska, replacing *Dr. Rebeckah Gibbons* who has resigned. *Donetta Schlaphoff* has returned from a semester of study at Cornell University and will be instructor in foods and nutrition on the University faculty this year. *Dorothy Wegener Monson* has joined the Food Service staff at Miller and Paine department store in Lincoln as assistant food director.

New York Dietetic Association. The summer issue of *The Bulletin* contains the annual reports of the president, president-elect, officers, and various working sections of the Association.

From the *Hudson Valley Dietetic Association* comes news that *Mrs. James Franco*, formerly Capt. Helen Johnson, M.D.D., has been appointed to the dietary staff at Troy Hospital, Troy. *Dr. and Mrs. Harold E. Himwich* announce the birth of their second son, Hugh, on March 5. Mrs. Himwich, formerly professor and head of the Department of Home Economics Research at Oklahoma Agricultural and Mechanical College, is now associate in physiology and pharmacology at Albany Medical College. *First Lt. Marguerite Queneau*, now a civilian, has returned to her former position with the New York State Health Department. *Evelyn Stook* is now working at Samaritan Hospital, Troy. *Dora Donop* and *Shirley Needham* are on the dining halls staff at Russell Sage College.

Irene Bly and *Roselene Maggio*, formerly with Rochester General Hospital, have both resigned their positions. *Alice Fritts* has been added to the dietary staff at Rochester General. *Bettie B. Clevenger* has left Eastman Kodak Company to join her husband in Denver. *Priscilla Hewey*, has been appointed to replace Mrs. Clevenger as assistant nutrition adviser. Three graduates of Eastman's administrative course for student dietitians are now on the dietary staff: *Phyllis Early*, *Madeline Williams*, and *Erma Smith*.

At its May meeting, the *Buffalo Dietetic Association* elected the following officers: President, Marie Sisson; Vice-president, Annette Rachman; Secretary, Marjory Hartwell; Treasurer, Lynne Sandborn. In June a picnic supper was held by the group at the summer home of Ruth Palmer, Angola-on-the-Lake. *Hortense Verckler* has come to Children's Hospital from Rochester to take charge of the food service.

North Carolina Dietetic Association. The Executive Board met Saturday, August 3, at the Salem Lee Hotel in Winston Salem with Sallie Mooring of the State Hospital, Morganton, presiding. The delegates for the Cincinnati meeting of the A. D. A. were chosen, and there was some discussion of the state meeting to be held in November. No date has been set, but announcement will be made as soon as possible. Jean Tait, vice-president, was authorized to buy 100 copies of *Dietetics as a Profession* to be distributed to teachers of home economics throughout the state so that students may become familiar with the opportunities offered in this field.

North Dakota Dietetic Association. May 20, 1946 was a memorable day in North Dakota for the dietitians. On that day the newly organized association held its first meeting. Small in number but undaunted in spirit, they eagerly planned the steps which will see the development of the state association.

Elvira T. Smith, professor of home economics at North Dakota Agricultural College, was elected president. Other officers are: Vice-president, Grace Cole, St. Luke's Hospital, Fargo; Secretary, Sister Mary Martha, St. Alexius Hospital, Bismarck; Treasurer, Marcene H. Ridley, Trinity Hospital, Minot; Chairman of the constitution and by-laws committee, Gladys Beyer, North Dakota State Tuberculosis Sanitarium, San Haven; Membership chairman, Ruth Herreid, Moorhead; Press relations, Phyllis Rowe and Gene Revell of Fargo.

The group adopted as one of its projects for the year the recruiting of high school graduates for the dietary field. Members throughout the state will be available to give talks and provide information on their field.

Ohio Dietetic Association. New officers of the *Cleveland Dietetic Association* are: President, Frances Langenbacher, Rainbow Hospital; Vice-president, Phyllis Jeffers, Cleveland Clinic Hospital; Secretary, Eleanor Tomcik, St. Luke's Hospital; Treasurer, Ruth Van Sickle, Huron Road Hospital.

Frances Langenbacher recently announced her engagement to Harold Rebman, also of Cleveland. *June Hamlin*, ward supervising dietitian, Cincinnati General Hospital, resigned September 1 to head a new dietary department in the New Norburn Hospital, a new 125-bed hospital in Asheville, North Carolina.

Mr. and Mrs. Robert Jones III (*née Elizabeth Knapp*), Shaker Heights, announce the birth of a son, Robert IV, on July 14. Born to *Mr. and Mrs. Clifford Torbet* (*Helen Robinson*) a daughter, Linda Carol, August 10. *Mr. and Mrs. Milford Witman* (*June Hockersmith*) have announced the birth of a daughter, Linda Sue. *Mr. and Mrs. Donald Judd* (*Margaret Lodder*) became the parents of a son, Andrew Jackson, in July.

Janice Kauffman, recently with Frigidaire Corporation, Dayton, was married August 31 to Thornton Vaughn Sparrow, Jr.

South Carolina Dietetic Association. Plans are being made for the state convention which will be held jointly with the South Carolina Home Economics Association on November 1 and 2 at the Hotel Wade Hampton, Columbia. *Lt. (j.g.) Genevieve E. Dziegiel* of the SPARS, following her release from service, has accepted a position as assistant in the Chilton Club, Boston. *Mildred Willis* is now at the Nautilus Veterans Administration Hospital, Miami Beach, Florida.

Mildred Walker, *Anne Collins*, *Margarite Tidmarsh*, and *Rosemary Jones* are new staff dietitians at Veterans Hos-

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Synonym for Dessert Satisfaction

Rennet milk desserts rank high in favor because they are nutritious, easy to digest, and dietetically correct.

JULLICUM gains its preference—and often its exclusive use—because of its high quality and range of flavors, the ease of preparation, its appetizing eye and taste appeal, and its characteristic smooth, firm texture.

Since first compounded in 1857, *JULLICUM* has been prepared as a liquid for impelling reasons. Fundamental is that rennet enzyme must be in solution before it can congeal milk. Thus, *JULLICUM* is most convenient in use. An even, positive mixture is assured. And, most often, authenticity of natural flavor is retained best in liquid form.

There is good reason for *JULLICUM'S* outstanding flavor appeal. No food product can surpass *JULLICUM* in the high quality of natural flavor sources. Such care is our continuing pledge.

Have you served a *JULLICUM DESSERT* recently? *Write us for a sample of your favorite flavor.* Compare dessert satisfaction—and cost.

Almond *Raspberry* *Butterscotch*
Lemon *Vanilla* *Sherry* *Orange*
Chocolate *Coffee* *Caramel*

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The oldest preparation in the United States for making milk desserts with rennet enzyme.

pital, Columbia. *Marguerite McInteer* is the new assistant at Tuomey Hospital, Sumter. *Ruth Tice* has been appointed to the staff of York County Hospital, Rock Hill.

Victoria (Australia) Dietetic Association. The June, 1946, issue of the *Newsletter*, recently received in the JOURNAL office, indicates that this Association is doing much to further dietetic work in Australia. A brochure on "Dietetics as a Career for Girls" has been prepared to stimulate interest in dietetics, and articles publicizing the profession have appeared in the daily papers. One committee of the Association has as its goal the establishment of a minimum salary for the trained dietitian.

The Association is proud that of the enlistments in the Army; more than three quarters of those enlisted were Victorian dietitians. Assignments were limited to base hospitals in each State. Dietitians were members of the Australian Army Medical Corps.

Fifteen new full members were admitted to the Association in the last year and one new associate member. The Association now has a total of 99 full members, 29 associate members, and a total membership, including honorary members of 142.

Victoria possesses the only Registration Board for Dietitians to insure standard qualifications for practicing dietitians. Until the end of 1947, admission to a studentship in dietetics at an approved hospital will require one of three alternative courses: bachelor of science degree; postgraduate course in dietetics under the Royal Victorian College of Nursing; or a diploma of institutional management and cookery. After the beginning of 1948, the only prerequisite training for student dietitians which will be recognized will be a Bachelor of Science degree, preferably with a major in nutrition. Students holding an approved diploma of institutional management and cookery commenced before 1944, would be eligible at any time to qualify as dietitians, upon completion of the 12 months' experience in a hospital approved as a training school.

Washington Dietetic Association. A two-day meeting was held January 18 and 19 at the New Washington Hotel in Seattle. Headlining the first day's program was a discussion of "Psychosomatic Medicine." Participants were: Dr. S. Harvard Kaufman, director, Mental Hygiene Section, State Department of Health; George Ault, executive secretary, Washington Society of Mental Hygiene; and Elizabeth Lamberty, Educational Division, Northern State Hospital. An informative current discussion of the architectural features of future building was given by Perry Johanson and Manson Bennett, members of the American Institute of Architects. "Current Trends in Diet Therapy" was presented by a trio of well-known Seattle people: Dr. Kazimir B. Skubi, The Swedish Hospital; Dr. Jennie I. Rowntree, director of home economics, University of Washington; and Mary D. Brakel, former Army dietitian. At one luncheon meeting Mary W. Northrop spoke on "Where Do We Go From Here?" which was later published in the JOURNAL. Three former Army dietitians, Ida Samuelson, Dorothy Eicher, and Betty Renshaw, told of their experiences overseas at an informal after-dinner group. At the business meeting, emphasis was given to the state project of the year—"A Survey of State Social Agencies"—which was shared by the four sections. The meetings concluded with a buffet supper at the University Faculty Club on the University of Washington campus and a theater party.

"The World Food Crisis" was the theme of the all-day summer meeting held June 7 in Seattle at the Women's University Club. The participants stressed cooperation of individuals and groups locally, nationally, and internationally as a key to a successful food conservation program. "Kitchen Knacks" was the topic discussed by May Klock, senior home economist of City Light Company. Then Donald Forsythe, assistant merchandising manager and food buyer, Frederick and Nelson department store, told of commercial food trends. Dr. Jules Marton gave an interesting talk on Hungarian food. Dr. Marton is well known in Seattle for his excellent cuisine. A. E. Lovitt, King County agriculture extension agent, talked on "The State Food Market." Mabel Mulliken told of the new 80 per cent extraction flour and had samples of the new and old type flours. Dr. John R. Huber, professor of economics and business, University of Washington, and well-known radio commentator, gave a picture of world-wide food conditions. Mrs. Ruth Fratt, better known as "Dorothy Neighbors" of the Seattle *Times*, discussed the local agencies working for famine relief. The state project was reported by Virginia Saibel, chairman of the Community Education Section. The objectives were: (a) to interpret the profession and the Washington State Dietetic Association to other agencies in order to establish a basis for greater understanding and appreciation of the work of the dietitian; (b) to ascertain what positions are open for dietitians and to learn whether organizations too small to employ a dietitian would be interested in part-time service; and (c) to determine what help agencies would like.

Ninety-six dietitians were asked to interview 166 designated agencies throughout the state to obtain desired information. The same questionnaire was used for all agencies. Of the questionnaires sent out, 87 or 52.4 per cent were returned; 62 or 37.3 per cent completed; 22 hospitals, 12 case work agencies, 14 public schools, 4 nursery schools, and 8 business agencies were represented. Social highlights of the day were the luncheon held at the Women's University Club and a tea.

Wisconsin Dietetic Association. The Executive Board met at the City Club, Milwaukee, August 3. Informal conversation centered around the Norwegian boy adopted by the Wisconsin Association and the French girl adopted by the Madison Association. It would seem that these two children are receiving good care. Interesting letters have been received from both. The Wisconsin Association also contributed to the support of a European school. The business of the meeting concerned revision of the constitution, printing of the *Wisconsin Dietitian*, and the award of the scholarship offered to home economics graduates of the five schools in the state. The fund is intended to help with fifth year expenses. *Ada Whitford*, University of Wisconsin, and *Betty Jay*, Milwaukee Downer College, were the winners.

Ethelyn Engebretson has been appointed to the staff at Columbia Hospital, Milwaukee, replacing *Margaret Telish*, who has accepted a position with the National Dairy Council. *Virginia Pflaum* has been appointed chief dietitian at Milwaukee Children's Hospital. *Dorothy Williams*, who served on Saipan during the war, is now employed at Milwaukee County Institutions.

Six student dietitians have completed their training in hospital dietetics at Milwaukee County Institutions. They are: *Ethel Anderson*, University of Utah; *Ann Wiebrecht*, Iowa State College; *Kathryn Blotz*, University of Wisconsin; *Ethelyn Engebretson*, St. Olaf College; *Ruth Lange*, Iowa State College, and *Doris Dickinson*, Montana State College.

News about Members

The following members of the American Dietetic Association have recently accepted new positions and appointments:

Jean Alice Anderson, recently separated from the Army, is now therapeutic dietitian at the University of Chicago Clinics, Chicago.

Martha Barmes is the new assistant dietitian in the cafeteria of Eastman Kodak Company, Rochester, New York.

Dora M. Bearer upon completion of her student dietitian training has been appointed assistant cafeteria manager for the Bell Telephone Company, Dayton, Ohio.

Audrey S. Bentley has accepted an appointment in the Institution Management Department, New York State College of Home Economics, Ithaca, New York. She was formerly connected with Children's Hospital, Buffalo.

Margaret Cowden Bernard has received the appointment of chief of the Dietetic Division, Veterans Administration Branch Office No. 13, Denver. Mrs. Bernard reported for work on August 1. She was previously chief dietitian, Michael Reese Hospital, Chicago.

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Made of the metal that cooks best . . . easy to clean

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Sara B. Black took up duties as assistant dietitian at the Brooklyn Hospital, Brooklyn, New York, on August 1.

Betty Jean Brewer has been transferred from Veterans Administration Branch Office No. 2, New York City, to the Veterans Administration Hospital, Bronx, New York. Her new title is assistant chief dietitian.

Mary Louise Clippinger has accepted a new position with Stouffers, Inc., and travels much of the time.

Edith Fae Cook became assistant dietitian at Texas State College for Women, Denton, on July 21.

Jean Carol Davis' first position after completing student dietitian's training is that of residence hall dietitian, Washington State College, Pullman, Washington.

Winifred De La Vergne has resigned as chief dietitian at Staten Island Hospital, New York.

Eileen Ehrhardt began work as therapeutic dietitian at St. Bernard's Hospital, Chicago, Illinois, on July 29.

Ruth Frahm has resigned from the Department of Nutrition, Montefiore Hospital, New York City, to accept a position at Reed College Commons, Portland, Oregon.

Ruth E. Franklin has been appointed to the staff of University of Michigan Hospital, Ann Arbor. She has just completed the St. Marys Hospital (Rochester, Minnesota) approved training course for student dietitians.

Marilyn Glasser has left City Hospital, Indianapolis, to become staff dietitian at Charity Hospital of Louisiana in New Orleans.

Arline Gonnella has been appointed dietitian at St. Joseph's Hospital, San Francisco.

Ruth Charlotte Hansen has a new position at St. Luke's Hospital, Racine, Wisconsin.

Marie Ione Hansen is the new staff dietitian at St. Vincent's Hospital, Portland, Oregon. This is her first position after finishing her student dietitian's training.

Velma E. Harwood is now a clerk in the Billeting and Messing Section for the Engineer Corps in the Philippines.

Lucille Herrmann, formerly assistant dietitian at the Mayo Clinics, Rochester, Minnesota, has been appointed consulting dietitian, Billings Clinic, Billings, Montana.

Jane G. Holcombe began a new position as assistant dietitian, Yale University, on September 1.

Agnes M. Hough, formerly a consultant dietitian in Chicago, has accepted a position as teaching and therapeutic dietitian at Wesley Memorial Hospital, Chicago.

Caroline Jarvi is now dietitian, Commissioned Officers' Mess, U. S. Naval Base, Bremerton, Washington. She has been dietitian, Puget Sound Navy Yard, Bremerton.

Juanita I. Kahler has been appointed assistant professor of institutional economics, The Commons, Washington State College, Pullman.

Jean Kasper is now dietitian at St. Michael's Hospital, Grand Forks, North Dakota.

Clare Korb, formerly chief dietitian, Sunny Acres Sanatorium, Warrensville, Ohio, has a new position as plant cafeteria manager, General Electric Company, Cleveland.

Elizabeth Kukst has accepted the position of food service director, American Institute of Foreign Trade, Phoenix, Arizona. She left a position as dietitian, Cowie Hall, Harvard School of Business.

Ethel M. Linton has resigned from Undercliff Sanatorium, Meriden, Connecticut, to accept an appointment at Teachers College of Connecticut, New Britain.

Roberta A. London, formerly dietitian at York County Hospital, Rock Hill, South Carolina, is now with the Spring Maid Club, Lancaster, South Carolina.

Ada M. Lovett has left the Commissary Department, Naval Training Center, Great Lakes, Illinois, to accept a position with Winter General Hospital, Topeka, Kansas.

Annette L. Mayer is now dietitian for the Alex Jackson Hotel, Rapid City, South Dakota.

Mildred Petro McMahon has a new position as dietitian at Women's Hospital, Cleveland.

Aileen Merwin became educational director at Michael Reese Hospital on September 15.

Frieda L. Meyer has accepted an appointment in the Department of Biochemistry, Woman's Medical College of Pennsylvania, Philadelphia. She left a position at Wayne University College of Medicine, Detroit.

Ella Jane Meiller, formerly assistant professor at Kansas State College, has been appointed to the staff of the Lying-In Hospital at the University of Chicago. Miss Meiller will participate in a special study planned to correlate dietary intake with laboratory and clinical findings.

Sara O'Connor has resigned from her position at Abbott Hospital, Minneapolis.

Frances Ilene Olson, who has just completed the student dietitian training course at St. Mary Hsospital, Rochester, Minnesota, has been appointed dietitian at St. Elizabeth's Hospital, Lincoln, Nebraska.

Alice B. Peyton has been appointed assistant professor of nutrition and dietetics in the Frances Payne Bolton School of Nursing, Western Reserve University, Cleveland. She has been administrative and teaching dietitian at St. Mary's Hospital, Passaic, New Jersey.

Margaret Phillips Randolph, formerly with the Home Economics Department, Iowa State Teachers College, Cedar Falls, has accepted an appointment in the Department of Foods and Nutrition, Kansas State College, Manhattan.

Margaret Lindsay Rosemergy is now on the staff of the University of Michigan Hospital, Ann Arbor.

Ruth Roth, formerly staff nutritionist, Pennsylvania Department of Health, Harrisburg, has accepted a position as nutritionist, Public Health Federation, Cincinnati.

Irene M. Sakacs has a new position with the Good Samaritan Hospital, Phoenix, Arizona.

Margaret E. Sartor has resigned as dietitian, Los Angeles County Hospital, to become cafeteria dietitian, Hermann Hospital, Houston, Texas.

Jeannette Tait Schibsted has been appointed county nutritionist for the Island of Hawaii.

Bertha Sexton has left St. Vincent Hospital, Birmingham, Alabama, to accept an appointment at Mississippi Delta Teachers College, Clereland, Mississippi.

Sister Gertrude Clare Geldreich has been transferred from St. Joseph Hospital, Mt. Clemens, Michigan, to Glockner Sanatorium and Hospital, Colorado Springs.

Catherine C. Smith is now dietitian at one of the residence halls at Stanford University.

Elizabeth C. Spengler has accepted a position with the Creole Petroleum Company, Carpite, Venezuela.

Reba Staggs has been promoted to the position of director of the Department of Home Economics, National Live Stock and Meat Board, Chicago. She was formerly assistant director.

Gladys B. Swenson has been transferred from the Veterans Hospital, Los Angeles, to the Veterans Hospital, Phoenix, Arizona.

Pearl A. Thoreson, until recently a Medical Department Dietitian, is now head of the Diet Therapy Department, Rochester General Hospital, Rochester, New York.

Marion Tolman, before her graduation a student dietitian at Henry Ford Hospital, Detroit, has been appointed staff dietitian at Cambridge Hospital, Cambridge, Massachusetts.

Virginia B. Turner, who completed work on her master's degree in nutrition at Columbia Teachers College in June, has received an appointment to Hood College, Frederick, Maryland.

A. Elizabeth VanAlstyne is now dietitian at the University of Maine, Orono, Maine.

Mary E. Whetzell, newly graduated student dietitian, has accepted a position as therapeutic dietitian at the Allegheny General Hospital, Pittsburgh.

Grace M. White has left the advertising agency of Batten, Barton, Durstine and Osborn in New York to accept a position as home economics director for *The Family Circle Magazine*, New York City.

Ethel B. Whitney, on completion of her student training at the University of Michigan Hospital, Ann Arbor, has been appointed staff dietitian at the same place.

Bettie Wingrove, formerly therapeutic dietitian at St. Vincent's Hospital, New York City, is now instructor in home economics, University of Nevada, Reno. In February Miss Wingrove was awarded her master's degree in nutrition and public health at Columbia Teachers College.

After 16 years as chief dietitian at Brooke General Hospital, **Capt. Nell Wickliffe** has been transferred to the Army Medical Center, formerly Walter Reed General Hospital, Washington, D. C., where she will serve as chief dietitian. **Capt. Grace Smith,** chief dietitian, Oliver General Hospital, Augusta, Georgia, will succeed Capt. Wickliffe at Brooke General Hospital.

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Amy L. Wiskocil, until recently food production supervisor, Indiana University, Bloomington, has been appointed cafeteria manager of residence halls and Walwood Union at Western Michigan College, Kalamazoo.

LeVelle Wood has been appointed associate professor and chairman of the Institutional Management Division, School of Home Economics, the Ohio State University, Columbus. Miss Wood for some years held the position of associate professor of institutional management at Kansas State College, Manhattan. During the war she served 21 months overseas with the American Red Cross in Africa, Sicily, and Italy. In the more recent past, she acted temporarily as assistant to the executive secretary in the Chicago office of the Association.

Announcements of the following marriages have been received in the JOURNAL office:

Avanelle Brenneman, a life member of the A. D. A., was recently married. Her new name is Atchinson, and she has moved from Indianapolis to Cleveland, Ohio.

Lucile Deal (née Rose), formerly dietitian, Greenville General Hospital, Greenville, South Carolina, has both a new husband and a new position. On October 1 she takes up duties as school cafeteria manager, Public School System, Raleigh, North Carolina.

Carol Jones Dornan, following separation from the Army, has accepted a position as instructor, Department of Institutional Management, Kansas State College, Manhattan, where her new husband is in school.

Georgia G. Edgington is now Mrs. Vincent L. Gallagher and is living in Bayonne, New Jersey.

Olga Helen Fitzpatrick is the new Mrs. Milnor E. Gleaves, and has moved from Los Angeles to Berkeley, California.

Charlotte Frederickson was recently married to R. R. Binnie. She has resigned her position as dietitian at St. Catherine's Hospital, East Chicago, Illinois, and is now living in South Bend, Indiana.

Irene Geller (née Jarose) was recently married and has resigned her position with the Illinois Bell Telephone Company.

Mary Hentrich (née Wand) resigned her position as teaching dietitian at St. John's Hospital, Springfield, Illinois, to be married and is now living in St. Louis.

Neola Tomlinson Hicks moved from Athens, Michigan, to South Orange, New Jersey, following her recent marriage.

The announcement of the marriage of Marie L. Hines to Dr. Jay DeWitte Sharp on August 29 at Geneva, Ohio, has been received in the JOURNAL office. Dr. and Mrs. Sharp are both connected with University Hospital, Cleveland, and will make their home in that city. Mrs. Sharp is secretary of the American Dietetic Association.

Mary Helen Holbert, a former Medical Department Dietitian, was recently married to Chase C. Wilson and is now living in Sterling, Kansas.

Hedvig Linnea Johnson is now Mrs. Valton Watkins and has left her position at Illinois Central Hospital, Chicago, to move to Beloit, Wisconsin.

Ruth I. Maple, formerly with the Veterans Administration, Aspinwall, Pennsylvania, is now married to A. J. Sautter and is living in Millsburg, Ohio.

Ruth Dale McCoy (née Brubaker) has notified the A. D. A. of her recent marriage and change of residence from Bartlett, Texas, to Nelson, Nebraska.

The marriage of **Geraldine O'Farrell** to George Edward Tobin, on June 20 in Chicago has been announced by her parents.

Evelyn Patty, formerly catering manager, Chicago College Club, was recently married to O. W. Stringer and is now in Jackson, Mississippi.

Mary Jane Rankin, with Methodist Hospital, Ft. Wayne, Indiana, recently became Mary Jane Rose and moved to Maryville, Tennessee.

Dorothy Rubinoff, formerly with Boston City Hospital, is now living in Brooklyn, New York, as Mrs. Mauray Tye.

Birdie Snyder (née Hinitz) was recently married. She is continuing her work as staff dietitian, Jewish Hospital, Philadelphia.

Jacqueline Snyder is now Mrs. H. P. Glindeman, Jr., and has given up her position at Children's Orthopedic Hospital, Seattle, to move to Evanston, Wyoming.

News from Advertisers and Exhibitors

The *American Dry Milk Institute,* Inc., Chicago, has presented the C. E. Gray Award "for achievement in research, the development of standards for production and packaging of dry milks, and in general industry and public welfares" to three men: Dr. E. C. Thompson, The Borden Company, New York City, chairman of the Standards Committee and his two co-workers, Dr. Arnold H. Johnson, Sealtest Laboratories, Baltimore, and Martin M. Kloser, Bowman Dairy Company, Chicago. . . . *Westinghouse Electric and Mfg. Co.,* Mansfield, Ohio, has announced the appointment of Mrs. Ollyne Jeffries as home economist of the Southwestern District. Mrs. Jeffries holds a master's degree from Texas State College for Women. Her experience includes home economics teaching and county home demonstration work. Westinghouse has appointed Marcella G. Liebeck, a graduate of the University of Tennessee as central supervisor of Westinghouse Home Economics Institute. Miss Liebeck will be stationed at Mansfield. She has been a teacher of vocational home economics and also home service director of the Tennessee Public Service Utilities Board. Westinghouse now has available three new booklets in the series of home freezing bulletins prepared by Julia Kiene for the use of home economists, teachers, and extension specialists. They are titled: "How to Freeze Meat and Game," "How to Freeze Poultry, Fish, and Dairy Products," and "Slaughtering and Dressing Poultry." . . . *Savory Equipment, Inc.,* Newark, announces new models of Savory toasters. A complete supply of folders, catalogue sheets, specifications, and price lists will soon be available. . . . *Wilson and Company* announces that the label of their one pound, four ounce jar of B-V, has been restyled to make it more descriptive and helpful for institutional use. The label now features easy-to-read one gallon recipes for vegetable soup and gravy as well as a recipe for B-V bouillon. . . . *Toastmaster Products Division of McGraw Electric Company,* Elgin, Illinois has announced that allocation of Toastmaster Commercial Toasters has been discontinued. During the first five months of 1946 Toastmaster Products Division shipped over twice as many 4-slice toasters as were shipped in the entire year of 1940. Production of the Toastmaster Roll and Food Warmer will be substantially increased in the near future.

John Sexton & Co. has announced the purchase of a six-story building in Long Island City, New York, which almost doubles the New York facilities the company previously had available. The new location will serve as a center for the company's sales and distributing activities, and will be used as well for coffee roasting, tea packing, and light manufacturing. . . . A new catalogue has been issued by *The Cleveland Range Company,* which not only illustrates and describes various Steam-Chef models, but includes a section designed to help in selecting equipment for a particular installation. . . . *General Foods Corporation* is now marketing all Post's cereals in a new "Fresh Protector" package, which has been engineered to retain freshness of cereals longer. The new packaging materials were developed in General Foods Laboratories. General Foods has announced that the institutional markets will be serviced with Instant Sanka—the new soluble decaffeinated coffee—with individual portions packed in plastic envelopes. Also from General Foods comes word of the purchase of the Ford Motor Company buildings in Houston, Texas. This step was taken because an expanding market for coffee in the Southwest has necessitated increased production space. The additional floor space will make it possible to manufacture other General Foods products in Houston. After several months of research by two dietitians and an entire staff of nutritionists, a revised "Nutrition Yardstick," priced at 75 cents, is now ready for distribution by

"If you ask Me, Carnation's a boon!"

IN any diet kitchen, Carnation Evaporated Milk is instantly ready to meet every milk need—routine or emergency. It's *safe* milk—sterilized after air-tight sealing. It's *soft-curd* milk, readily digestible, ideal for bland diets. It's creamy-smooth milk, imparting a *velvet blend* to even the simplest foods, to pique the appetite. And it's *versatile* milk, with many wonderful uses!

- It whips! Chilled icy-cold, one cup of Carnation Milk fluffs into *three* cups of snowy lightness—for tempting toppings and desserts that are not too rich in butterfat.
- It freezes smoothly into delicious, flavorful sherbets and ice creams.
- It makes rich, velvety cream sauces and soups.
- It is easily acidified with lemon juice or vinegar, for sour milk or sour cream recipes.
- When used undiluted (*twice* as rich as ordinary milk) it supplies doubled milk nutrients without increasing volume.
- It may be served undiluted with cereals, fruits, coffee, or tea—or mixed half and half with cold water (whole-milk dilution), or with fruit juices, for drinking.
- Homogenized, sterilized, and fortified with vitamin D_3, it is especially suitable for infant feeding.

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"From Contented Cows"

the *National Live Stock and Meat Board*, Chicago. In the revised "Yardstick," transparent slides, through which a person can see how rapidly his diet is approaching the adequate zone, have been used. . . . The *Hawaiian Pineapple Company, Ltd.*, has announced the appointment of Alice W. Brown to assume the Dole home economics services of "Patricia Collier." Miss Brown holds a B.S. degree in home economics from Tennessee College and for six years was director, Home Service Department, Electric Power Board of Chattanooga, Tennessee. During the war, as a WAC Major, she served as Chief of Bakers and Cooks Schools at Des Moines, Iowa, and Ruston, Louisiana. Also announced by Hawaiian Pineapple Company is the commercial production of frozen fresh Hawaiian pineapple. It will be test marketed in Newark, New Jersey, and Reno, Nevada. The frozen fresh pineapple will appear in a newly designed 1-lb. package featuring the Dole label. . . . *The American Institute of Baking* has just issued a new leaflet *Information on Bread and Flour Enrichment*, which answers briefly questions most frequently asked concerning enrichment of bread and flour. . . . *Arthur L. Peirson and Company* (Art's Brand corned beef hash) is distributing a set of recipe cards featuring this brand of corned beef. The recipes were created by Louis P. DeGouy, well-known chef who writes for *The Gourment*, *Restaurant Management*, and other magazines. An envelope containing 12 quantity recipes, including soups, entrées, salads, and desserts may be obtained from the *Public Health Committee of the Paper Cup and Container Institute*. Each recipe is printed on a 4 by 6 in. card with a hole punched in the top so that it can be hung up for reading while food is being prepared. . . . . A new, stainless steel container for packaging individual freshly cooked hot meals is announced by *Mealpack Corporation of America*. In using it, each meal is placed in a plate, sealed with an aluminum foil cover. The plate with the lid is then placed in the container and sealed to preserve natural heat. A cardboard disk is inserted in the locking device to identify special diets. The container is said to enable serving hot meals up to three hours after packing. . . A new edition of *Case Histories of Successful Mass Feeding Installations* is ready for distribution by *G. S. Blodgett Company, Inc.* The booklet illustrates with kitchen plans and clean photographs 28 cases of good kitchen design in institutions, hospitals, schools, industrial feeding establishments, restaurants, and hotels. Well-known installations are used through-out. . . . *Wyandotte Chemicals Corporation* has announced that $25 million will be spent in additions and enlargements to its present plants within the next 18 months. One phase in its expansion in the organic field will be the erection of a new synthetic detergent plant. Another organic unit, already under construction, will supply materials to the commercial chemical field. In addition to the installation of these facilities for production of new products, Wyandotte will erect new plants to increase production of chlorine, calcium carbonate, and soda ash. Improvements in the present method of producing caustic soda will also be a feature of the expansion program and will increase the output of this chemical, an essential ingredient in products used for milk and beverage bottle washing, fruit and vegetable peeling, and in certain tanning, textile, and metal cleaning processes.

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REDUCTION DIETS IN POPULAR MAGAZINES

A check of reduction diets published in widely circulated, popular women's magazines, such as *Good Housekeeping*, *Vogue*, and *Mademoiselle*, was recently completed by a committee of the Kansas City Dietetic Association. Virginia Monahan Bayless served as chairman of the activity. A careful analysis of the diet outlined by each magazine was made and tables compiled to determine whether the diets meet the recommended allowances set up by the Nutrition Committee of the National Research Council.

Of the three diets, that published by *Good Housekeeping* proved to be the only one which is adequate, well balanced, and meets all nutritional standards—except, of course, caloric requirements. The *Vogue* diet, which was published in the November 1, 1945, issue, provides adequate protein, calcium, iron, and vitamins A, C, and D. However, quantities of the vitamin B-complex—thiamin, niacin, and riboflavin—are inadequate. *Mademoiselle*, in its August (college), 1945, issue, included both a six-day diet of slightly more than 1200 calories and a one-day diet of about 900 calories. The study revealed that the one-day diet is deficient in every known nutritive factor except vitamin A and C, while the six-day diet is inadequate in calcium. Both diets are exceedingly low in vitamin D.

Letters were sent to the two magazines which published poorly planned diets, pointing out the nutritional errors and suggesting that in the future it would seem wise to consult a qualified nutritionist before printing other diets to insure adequate nutritional values in such recommendations. It is interesting that *Vogue* replied, saying that the editors are anxious to avoid such errors in the future.